



**JALAI ALUN - THE INFLUENCE OF THE NEW
ROAD ON LAND USE AND RURAL LIVELIHOODS
IN KAMPUNG ENTANGGOR, SARAWAK**

Final report

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Abstract

In accordance with The Eleventh Malaysia Plan 2016-2020, the Malaysian state of Sarawak, Borneo, will continue to see rapid changes in land use, particularly in the agricultural sector, in order to achieve economic development goals. These changes impact rural livelihood strategies, such as those employed by the village of Entanggor. This study aims to identify how the new road (built in 2013) impacts access to the capital assets, as identified in the Sustainable Livelihoods framework, for residents of Entanggor. This research primarily focuses on the extent of land use changes and the causes of such changes, in relation to the national development strategy. We carried out our research using an interdisciplinary approach, incorporating both qualitative (social) and quantitative (natural) methods, in order to build a holistic view of the influences on community life. Our information was gathered from members of the Entanggor community, including current, returning and previous inhabitants, as well as insights from government representatives. The findings conclude that both the road and national development strategy impact the five capital assets, and indirectly the livelihood strategies of Entanggor residents, yet it is too early to determine to exactly what degree the capital assets will be impacted.

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Abbreviations

ESS - Ecosystem Services

JKKK - Village security and development committee

NCR - Native Customary Rights

NTFP - Non-Timber Forest Products

PIL - Pepper Industry Development Programme Scheme

PRA - Participatory Rural Appraisal

RISDA - Rubber Industry Smallholders Development Authority

RM - Malaysian Ringgit

SLF - Sustainable Livelihood Framework

SLUSE - Sustainable Land Use and Natural Resource Management

SSI - Semi-Structured Interviews

UCPH - University of Copenhagen

UNIMAS - University Malaysia Sarawak

Introduction

Livelihood strategies continually adapt to both economic and political influences, by which assets such as land and ownership rights are allocated and re-allocated (Cramb, 2009, p. 278). The Malaysian state of Sarawak has a long history in small scale cultivation, although this livelihood strategy has seen a dramatic change with the introduction of cash crop cultivation. The new commercial crops were introduced along with the establishment of large-scale plantations by the British rulers (Athukorala and Loke, 2009, p. 154-155), with rubber being introduced in 1876, palm oil in 1917 and cocoa in the 1950s. Government policies have encouraged the adoption of such crops through schemes and subsidies (i.e. for fertilisers) (Athukorala and Loke, 2009, p. 154-155). The cultivation of cash crops is highly dependent on market prices. For instance, rubber cultivation increased when market prices rose in 1970s, until government policies shifted the emphasis from rubber to palm oil by the distribution of palm oil specific grants (Athukorala and Loke, 2009, p. 154-155).

The Chief Minister of Sarawak, Abdul Taib Mahmud (in power during 1981-2014), was a strong supporter of modern, large-scale agriculture and its ability to bring about economic and social development (Cramb, 2009, p. 283-284). Consequently, agricultural schemes that bring together smallholder farmers and large scale agriculture have been adopted through joint ventures, whereby smallholders land is provisionally leased for 60 years, giving companies the right to develop, mostly being palm oil plantations (Cramb, 2009, p. 283-284). The Eleventh Malaysia Plan 2016-2020: Anchoring Growth on the People, outlines the government's strategy to achieve an advanced economy status by 2020 or earnings above \$15,000USD per capita (Eleventh, 2015). Industries expected to expand include the agricultural sector, with a projected expansion of 3.5% per annum. Emphasis will be on increasing productivity through the modernisation of the sector, supported by greater innovation, research and development. The oil palm subsector is expected to expand by 2.8% with an increasing number of mature plantations, particularly in Sabah and Sarawak. The rubber subsector is also estimated to grow by 7.6% due to the expected price recovery (Eleventh, 2015)

Study Site and Village Context

Our study site is Entanggor, an Iban village situated in Sarawak in Malaysian Borneo, (Coordinates: N 01 27.105' E 110 52.186'). Entanggor is part of the Simunjan district. It is in close proximity to several other villages, the closest being Kesindu and Lunying, located on the Sebuyau side. The area has a hilly topography and several streams running through the village. (SLUSE, 2017). In 2013, road access was first completed to the village and shortly thereafter, in 2014, the community was included on the regional electricity grid (SLUSE, 2017). Before this, villagers relied on the river for transportation and generators for any electricity (SLUSE, 2017). The main livelihood strategies in Entanggor include the cultivation of cash crops such as rubber, pepper, cocoa, and pineapple, as well as some animal rearing, and subsistence agriculture. A large number of residents also receive income from outside sources including the government or from their grown children working in urban centers. In recent years, Entanggor has been subject to significant changes in land use, notably the development of cash crops and the new road development.

Theory

In this report we will utilize a Sustainable Livelihoods framework to better understand the strategies Entanggor residents employ for survival. Scoones (1998) describes the Sustainable Livelihoods framework as such:

This framework shows how, in different contexts, Sustainable Livelihoods are achieved through access to a range of livelihood resources (natural, economic, physical, human and social capitals) which are combined in the pursuit of different livelihood strategies (agricultural intensification or extensification, livelihood diversification and migration).

We will further strive to consider the ongoing changes to livelihood strategies in Entanggor in lieu of road access and development interest.

Objective and Research Questions

Our study objective is:

To identify how the road impacts access to the capital assets, identified in the Sustainable Livelihoods framework, for residents of Entanggor.

From this, we have developed the following questions:

1. Is the road access contributing to land use changes? If so, how is the land use changing and why?
2. How is the improved infrastructure in the village impacting the access to capital assets?
 - a. How does the road's impact relate to the national development strategy?

Methodology

Approach to the Study

A wide array of methods have been applied in this study to investigate the identified research questions. Both social science and natural science methods and interlinking methods (e.g. transect walks) have been used to determine the livelihoods of Entanggor villagers, the resources that are naturally available and those that are produced, and the influence of the recently constructed road. The overall focus of this study is on the empirical data we have collected during our stay at Entanggor, with the use of secondary data to support our findings and understanding. The theoretical framework of Sustainable Livelihoods is used for analysing the results in the discussion part of this report.

Transect Walks

Being part of the initial exploration of the village two transects walks were conducted. The walks were divided into one village and field walk, and one forest transect walk. The village and field walk was done to observe the fields and the different agricultural activities or other land uses along the way. The forest walk was done in the forested area beyond the fields, a little further away from the village where points of interest were non-timber forest products and timber species, as well as valuable forest services such as the village water source.

Both walks were done with guides from the village, who pointed out different land uses and plant species along the transects. This method helped us to gain an overview of the local topography and land use.

Questionnaire Survey

In the initial exploration of the village, the demographic composition and livelihoods of the villagers were investigated through a questionnaire survey on the household level. All researchers split into pairs and were accompanied by a translator while conducting the interviews.

Following Mikkelsen (2005 p. 89) we strived to collect large samples keeping the questionnaire short (30-45 minutes) and easy to code. To get a representative sample we collected 37 of the 78 of the households in the village. The surveys were done as face-to-face interviews rather than using self-administered interviews (Babbie 2007). This was to ensure that those with differing levels of education could equally take part in the survey, as well as allowing for some insightful dialogues and for the identification of key persons for later interviews and participatory activities.

Semi-structured Interviews with Villagers and Key Informants

The questionnaire survey provided us with information about the livelihood activities and demographics, but to understand why the certain activities are chosen and which factors impact these choices, we conducted 13 SSIs with several villager members. This included experts on forest use and on village history, the JKKK committee members and our cooks. As opposed to the structured questionnaires, the SSIs consisted of open-ended questions that allowed for following up with further questions on relevant issues (Mikkelsen, 2009, p.89).

Participant Observations and Informal Conversations

Throughout the study period, we engaged in observations and informal conversations facilitating a better understanding of daily practices and events as well as giving insights into the social interactions. For example, we participated in rice harvesting, cooking activities and in the collection of wild vegetables, and the conversations that we engaged in along the way were surprisingly enlightening. Also, during our stay one villager sadly passed away, and we took part in the following spiritual ceremonies and funeral gatherings, as well as attending a shaman ritual that all together made for some very interesting observations and allowed for a deeper understanding of the community's beliefs and culture. Due to the informal nature of this research method, the findings were logged in personal field notes and the key findings contributed to our collective research.

Resource Mapping

To understand the relationship of the village to the resources embedded within and surrounding Entanggor, we used the Resource Mapping PRA tool. The tool helped us learn about the community and its resource base. The objective was not to develop an accurate map but to get useful information about local perceptions of resources (FAO, 1999).

After a brief introduction the group of two men and two women developed the content of the map according to what they found most important in the village and the surrounding areas. All members of the group contributed actively, although in the beginning the men were taking the lead. The data from the mapping exercise contributed to a deeper and more grounded knowledge about the villagers choices, motives for action and their understanding of the community.

Seasonal Calendar

Using the PRA method of a seasonal calendar together with a few knowledgeable villagers, allowed us to better understand the income from agricultural activities on an annual basis. This time-related method was used to explore the temporal dimensions of people's realities (Mikkelsen 2005) and the income fluctuations over the year. The seasonal calendar required the

input of agriculturalists on their annual economic and subsistence activities. The group consisted of four men.

Future Aspirations Exercise

To try to depict the future vision and aspirations of the youth (Mikkelsen 2005) we made two PRA drawing sessions with ten children from the village (age range 6-10, including 2 girls and 8 boys). The children were recruited using the snowball effect. An A3 sheet of paper was laid out before them and they were asked to draw their responses to two different questions in turn (approximately 30 minutes was spent on each question):

QA) What would you like to be or do when you are older?

QB) What would you like to see in Entanggor in the future?

During each session we created a dialogue with the children, specifically asking them about their thoughts and reasoning behind their drawings.

Forest Inventory and NTFP Assessment

To try to get an overview of the forest resources in Entanggor, we set aside one day for a forest inventory and NTFP resource assessment. Three inventory plots of 10x10 metres were completed. Two of the plots were done in the community protected Pulau Galau forest and one plot was done in low-lying forest near to the village. Plots were selected where the forest appeared representative and where it was possible to do the required measurements. In the plots, all tree species were recorded and trees of >10 cm in diameter were measured for their diameter in breast height, and the height was measured with a clinometer.

In addition, we conducted an NTFP resource assessment of each plot, as well as along the way to and from each plot, to study which species and products were present in the forest. We relied on the knowledge of one villager and one botanist from UNIMAS for species identification. After the data collection, we calculated an estimated aboveground biomass as well as species richness and evenness.

Results

Context of Study Site

Entanggor comprises of 78 households, living in a mixture of newly built detached and semi-detached houses, and an older, partly inhabited long house. Facilities available include a pre-school, a primary school, two small shops, a clinic and football field (determined from the transect walks). In Sarawak, there is a state sanctioned political hierarchy, headed by the community leader (Andersen et al., 2016, p. 368). The headman (or tuai) is at the base of the Iban political hierarchy and is responsible for the welfare of his own longhouse community

(Andersen et al., 2016, p. 368). In the case of Entanggor, the status of the replacement headman is unclear, as the previous headman died in 2016 and they are yet to find an official replacement. As a result, community affairs are currently managed by their counsellor, the JKKE, and the various committees, comprising of sub-groups (see Figure 1 for the organisation chart). Our study includes findings from members of the Entanggor community, including current, returning and previous inhabitants, as well as insights from government representatives.

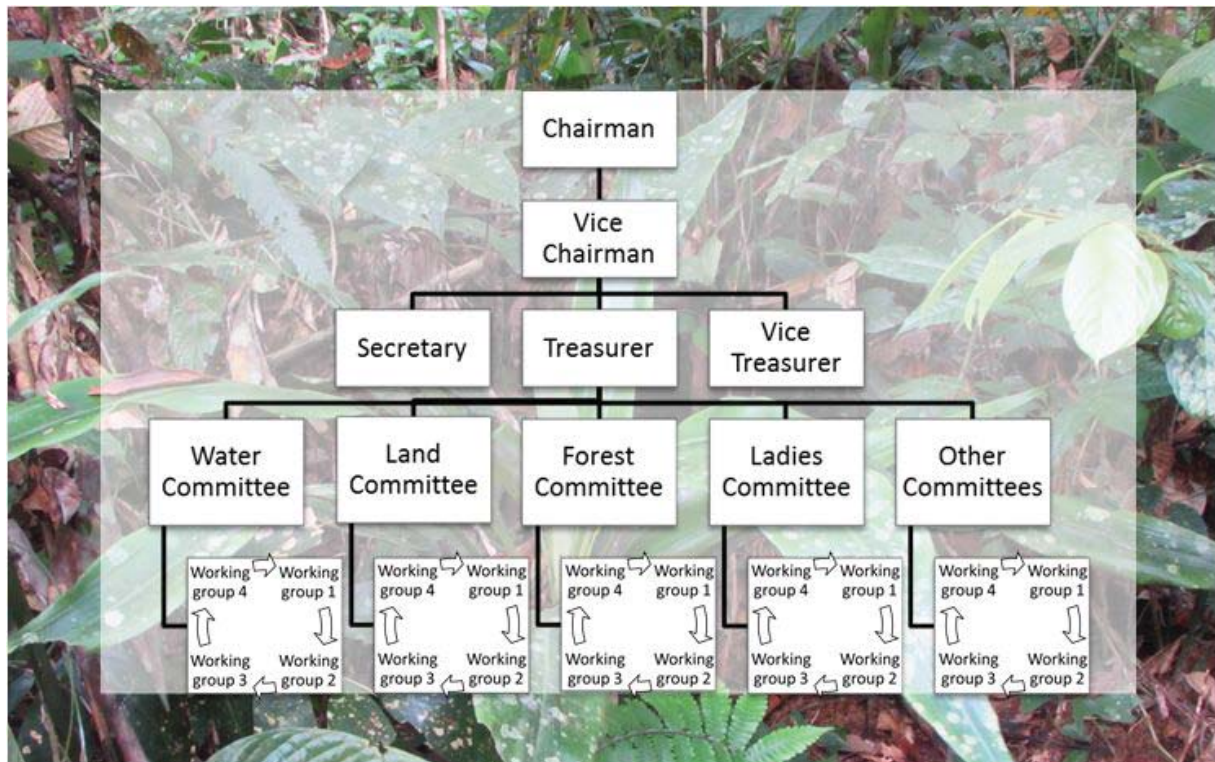


Figure 1 Organisation chart of the JKKE. Each committee consists of two members, including a Head and a Vice Head of the committee.

Context of people in Entanggor

Of the 37 households included in the questionnaire, 73 percent have a male head of the house and 27 percent have a female. The age range for respondents was 42 to 78 years old, with most respondents being within the age range of 60 to 69, as shown in Figure 2.

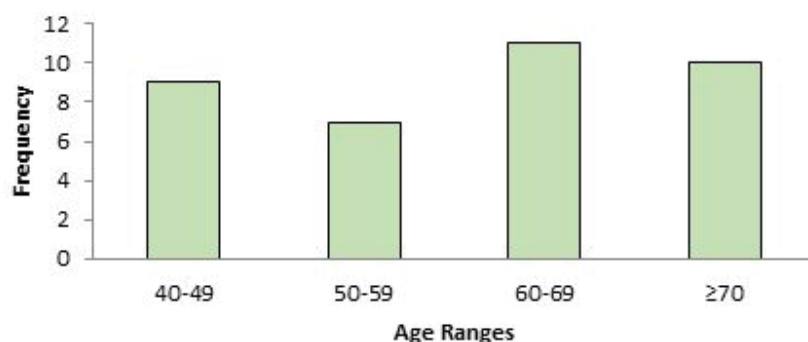


Figure 2 The age distribution among the heads of households, of the questionnaire respondents.

With the exception of two households, all engage in some form of agricultural activity, with 65 percent of respondents stating that it is their main source of income. Figure 4 displays the crops grown within Entanggor and whether they are used to sell or for the households own use. The two households not engaged in agricultural activity rely on government subsidies and/or pension or other job(s). Nearly half of the households, 40 percent, use a mixture of livelihood activities, including deriving additional income from family members that work in other sectors or by receiving funds from government aid or pensions. Figure 3 shows the distribution amongst these alternative sources of income, with government aid being the most common source of non-agricultural income.

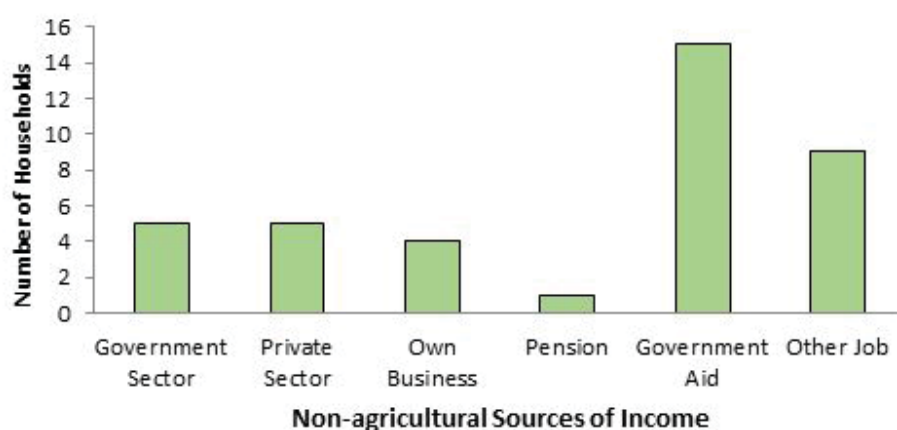


Figure 3 Alternative sources of income used by households, of the questionnaire respondents.

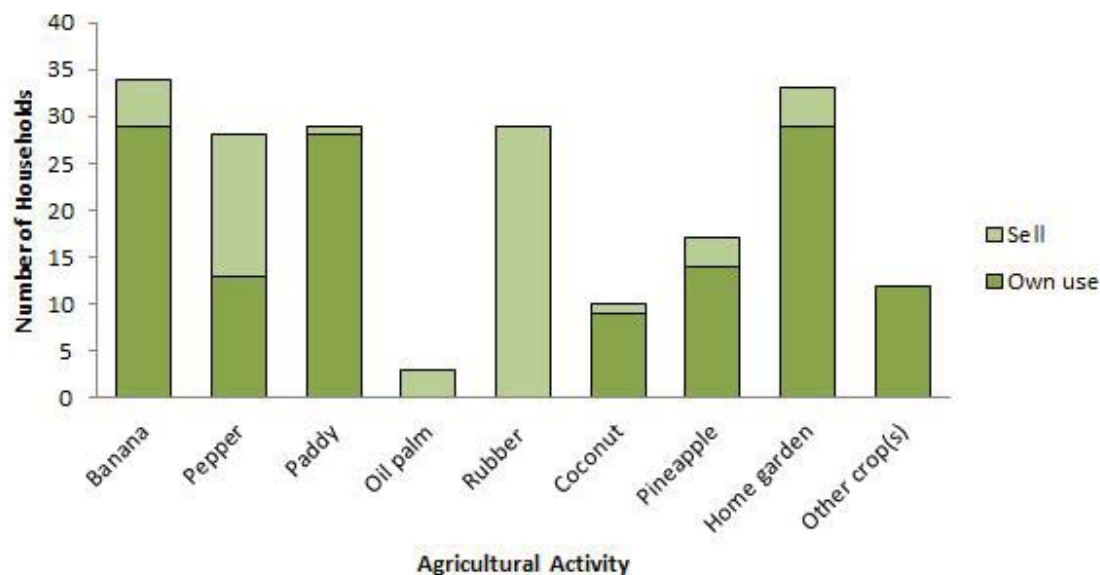


Figure 4 The crops grown and their uses, by households of the questionnaire respondents.

The main subsistence crop is paddy rice, alongside banana (see Figure 4). The primary cash crops include pepper and rubber, whilst palm oil cultivation is only a recent development and not so prolific in the area, as opposed to in other regions of Sarawak. The farming practices in the village are influenced by price fluctuations. For instance, the recent drop in the price of pepper has led to decreased pepper farming and a reliance on rubber tapping which offers a more favourable price at the market. A large majority of the Entanggor village (~50 households) participate in the rubber scheme RISDA that was introduced in 2016 (SLUSE 2017).

Migration

Questionnaires and SSI responses revealed that the younger generation commonly leave the village to pursue alternative employment and educational opportunities that are available to them in larger urban centres, such as Kuching. Of those that stay behind, the primary reason is to help to care for elderly family members and to aid them with the agricultural activities. There have also been cases of immigration of former residents, who wish to retire within Entanggor to be close to family members. However, there are certain conditions that must be met in order to be permitted to stay within or move to Entanggor, such as assuming an active role in the management of the community, by belonging to at least one of the committee groups or subgroups.

Emigration enables the younger generation to provide a safety net or extra means of income and support for family members who remain in the village. This is especially the case for elderly

parents who may lack the physical capability to support themselves solely from agricultural activities. Also the road access enables those who have emigrated to easily come back to visit families and so emigration does not appear to result in a loss of family contact.

On the other hand, a respondent stated that those who emigrate ‘forget how to survive in the village and forest’. Some villagers highlighted that emigration leads to a loss of traditional knowledge and abilities that enabled villagers to make efficient use of forest products and ESS (e.g. foraging for wild vegetables, medicinal plants). Also, a loss of culture and cultural practices can be seen, such as the diminishing knowledge of making local crafts (e.g. basket weaving).



Image 1: Future aspirations exercise

From the PRA activity carried out with ten children, the majority answered that they would like to move away from Entanggor in the future – although several stated that they also wanted to own land and property in Entanggor one day. It could therefore be assumed that they would rather own land and employ others to work on it, whilst they themselves only come back to visit once in awhile. When asked what they wish to become in the future, only one child showed an interest in becoming a farmer, whilst the others drew several differing careers (police officer, army officer, doctor, to name a few). These answers could be interpreted as showing that the youngest generation have their sights on alternative livelihood activities as opposed to

agriculture, and so may be likely to follow the older youth and migrate from Entanggor to pursue other non-agricultural opportunities.

Facilities

Access to and choice of facilities, including health, educational and power facilities, has greatly increased since the construction of the road. A significant change and professed benefit has been the introduction of electricity in 2014, which was made possible directly due to the road access. Beforehand, oil generators were used which were very expensive to run, costing 4 RM per litre of oil. Now electricity, is much cheaper or even free of charge provided that their monthly usage is below 20 RM. As such, households are able to save money and invest their disposable income in other goods and services – those primarily identified being food or drink product from town or investing their money in savings.

Access to health care has also improved dramatically. Prior to the road, the only means of transport to the nearest health clinic was a 7 hour journey by boat. With the new road access, villagers are able to frequent the clinic in Sebuyau town, for both emergency visits and check-ups, both faster and cheaper than they could do beforehand. A doctor arriving by helicopter pays monthly visits to the village, and this has remained unchanged since the road. The option of going to Kuching hospital for more advanced treatment is also now available. In serious cases, they are able to call ahead so that the hospital staff can prepare for their arrival.

Due to the improved access to town, this has opened up opportunities to put savings into banks and other shopping opportunities. A greater amount of food, drink and household items and materials are now purchased in town as opposed to being sourced directly from the village e.g. buying plastic in place of locally produced Bemban for baskets. The primary reason for this change is due to convenience, in that it is less labour intensive and time consuming to source such products from town.

Alongside the benefits of greater access to facilities, comes the threat of outside competition with facilities already in Entanggor. At present there are 23 students attending St. Andrews primary school in Entanggor, but there are shared fears among parents that the pull of better education outside the village will encourage further emigration and result in the closure of the school. On the other hand, in the neighbouring village of Kesindu children have easier access to the nearby school out of their town, thanks to the construction of the road.

Forest Resources and Services

From our data collection, we found that the forest areas in Entanggor serve many purposes. Observations and informal talks also reveal the spiritual connection that villagers have with the forest. For instance, after the funeral no one was permitted to enter the forest for 3 days due to the spirit of the late villager roaming the forest, showing that traditional beliefs still remain part of the culture.

Clean water in Sarawak is not available in all areas, but in Entanggor there is a very reliable and clean source originating from the rivers and streams of the forest, even in the dry season. The water committee, under the JKKK, is responsible for the management of the water reservoir and ensuring that the catchment area near to the water source is not being cleared or cultivated.

From the questionnaire we were able to see that the villages collect different NTFPs, mainly for their own consumption (see Figure 5). Most of the NTFP users collect wild vegetables e.g. fern shoots and bamboo shoots. Also of importance are the wild fruits such as mangosteen, jackfruit and durian. Some of the fruits are wild but others are cultivated in the forest near to the village, as observed during the forest inventory plot 3. Other NTFPs of importance include Bemban palm and Rattan that are used for traditional basket and mat weaving, done by some elder village women. Also medicinal plants are collected by the villagers



Image 2: Wild fern collected as vegetables but the importance seems to be diminishing with better access to healthcare. Nonetheless there is an abundance of plants that can be used for traditional medicine, as seen in the NTFP assessment.

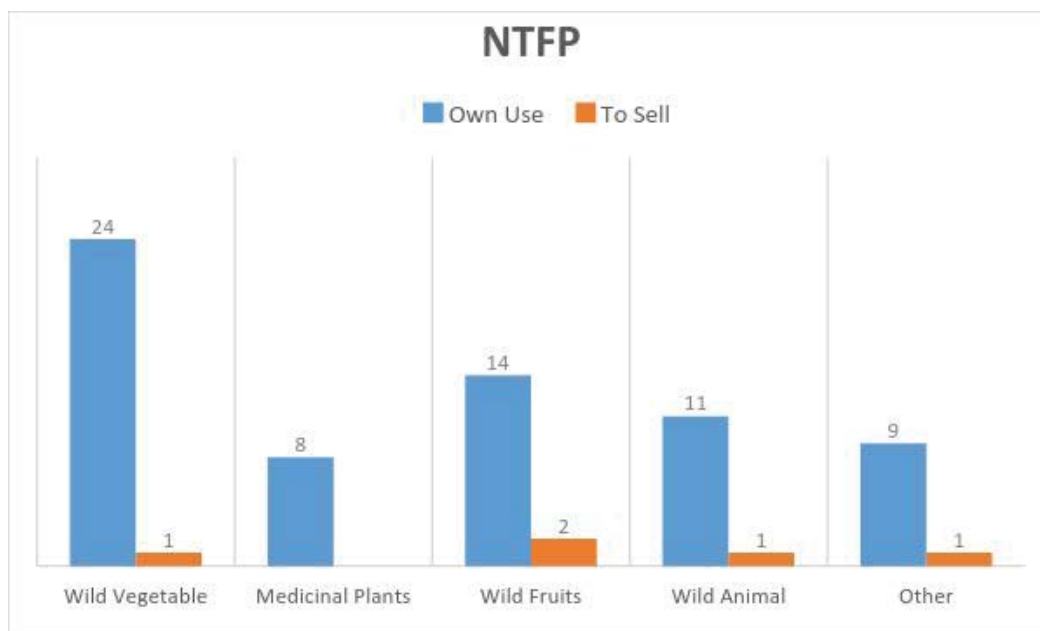


Figure 5 Data from questionnaire on NTFP collection

Several villagers were engaged in hunting activities, mainly for wild boar which is shared or sold among the villagers when an animal is shot. During an informal talk with one villager, over a meal prepared from wild boar, it was mentioned that animals from the Pulau Galau forest were preferred over the animals from the Bukit Tunggul forest close to the oil palm plantation. The reason being that the animals in Bukit Tunggul mainly feed on oil palm fruits and thus are less 'tasty' than the animals from the Pulau Galau, which feed off a more varied diet. Some villagers also engage in fishing activities in the forest rivers, selling some of the fish caught.

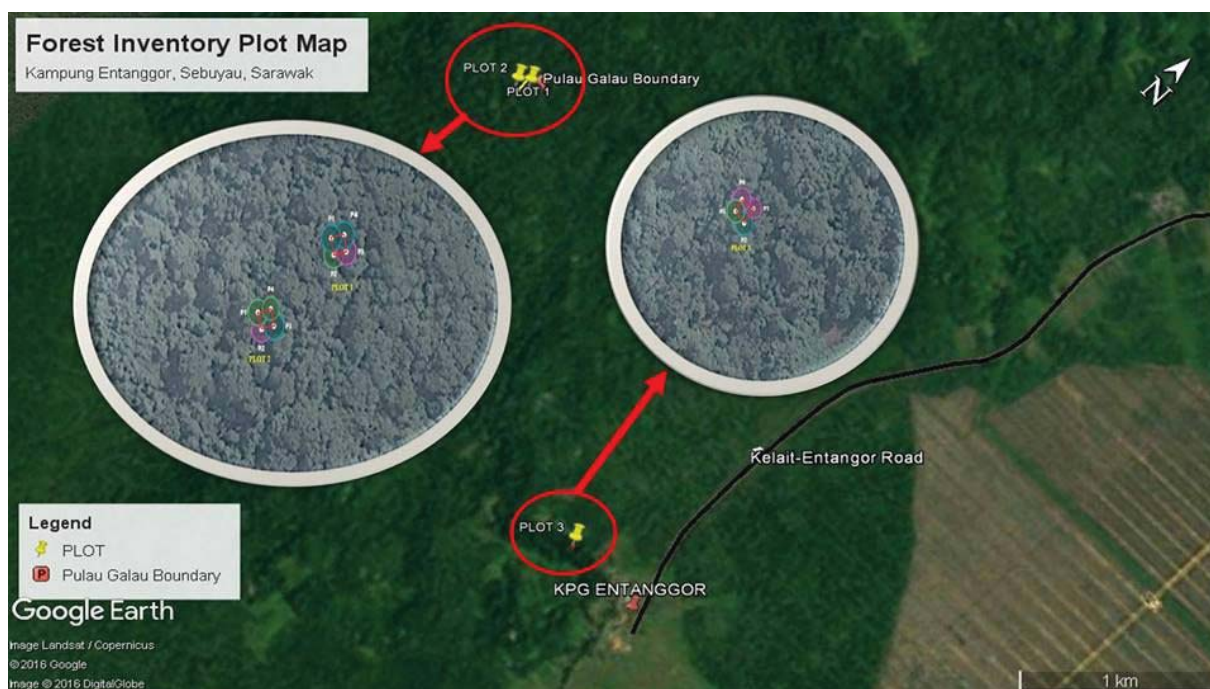


Figure 6: Forest inventory plots

The community of Entanggor have their own forest reserve, or Pulau Galau in Iban, called Bukit Padiiri that is located behind the old rubber plantation in the village, with boundaries being marked by ravines, streams and other natural features. When asked separately, both the botanist from UNIMAS and our forest guide agreed that the Pulau Galau forest area is in good condition with many species present, with just some of the larger trees missing (which is to be expected of this forest type). This was also our impression and was corroborated through the inventory plots (see Figure 6) and later from the aboveground biomass calculations. The forest inventory and the NTFP assessment in the Pulau Galau indicated a forest with a high diversity of trees, with several highly sought after species such as *Shorea* sp., *Diospyros* sp. and *Eusideroxylon zwagerii*. According to the forest guide, no part of the forest is left completely undisturbed by human activity, apart from some higher lying forest areas that are too far and too difficult for the villagers to travel to. In special cases, villagers are allowed to harvest timber for construction of their own houses, but this first requires permission to be granted from the JKKK committee. The last time someone asked and was granted such permission was in 2007.

The stumps left from the cutting of these hardwood trees can still be recognised and this is most likely why the very large trees in these parts of the forest are scarce.

Since the construction of the road, there have been threats from outsiders who wish to harvest timber illegally. To resolve this, Entanggor villagers set up a patrolling system in the area of Bukit Padiri. The head of JKKK leads the patrol with the help of approximately 12 younger men from the village. Although the JKKK patrols the area, villagers also often go into or near to the Pulau Galau to hunt and whilst doing so, look out for potential outsiders who may be encroaching. Since the road access to this village, the logging activities have reduced despite the high market prices offered by the timber companies, as villagers prefer to protect the forest resources. Some villagers have expressed during interviews that they view the forest as form of insurance or security.

Cash Crops and Land Pressure

The traditional farming system in Entanggor consisted of shifting cultivation of upland rice. In the 1940's the rubber tree, *Hevea brasiliensis*, was introduced and induced the shift from upland rice to wet paddy rice. The rubber activities have varied over time along with market price fluctuations. The most predominant cash crops in Entanggor today is rubber and pepper, cultivated by 80 and 77 percent of the questionnaire participants engaged in agricultural activities. Alongside with the cash crops, 80 percent also cultivate paddy.

To encourage smallholders to participate in commercial land development that is generating higher incomes, several agricultural schemes have been carried out by the government of Sarawak (Cooke, 2006, p. 51). Different types of agricultural schemes can be identified depending on who is managing the plantations and how the profit is divided. The stakeholders consists of villagers, governmental agencies and in some of the schemes also private companies. Pepper, that is one of the oldest schemes called Pepper Industry Development Programme Scheme (PIL), is managed fairly dependently by the smallholders that do receive subsidies for pesticides and fertilisers. Cultivating pepper is however perceived as a relatively expensive activity since it requires increased use of fertilisers and expensive sticks made by Belian wood for supporting the pepper vines. In addition to that it is also a fragile and labour intensive plant. Other cash crops are therefore seen as more beneficial by the villagers.

Since the road was built, several new cash crops and agricultural schemes have been introduced in the village. The new schemes include cocoa, pineapple and a replacement scheme for rubber. They are all administered by the Department of Agriculture. Aside of that, oil palm is since been cultivated three years ago by some villagers in previous fallow swamp areas. Palm oil is easy to plant and gives a good and stable income since it can be harvested all year around. The villagers have been enabled to cultivate palm oil since they have greater access to the markets and can bring the fruits to the road to be collected. However, none of the villagers have harvested any fruits yet since the palms only mature approximately three years after planting.

The new agricultural schemes are administered by the Department of Agriculture Sarawak. The villagers have to fill in an application form and hand it in to the Department of Agriculture. The information about the schemes is distributed to villagers by the headman or JKKK, that receive the information from the Department of Agriculture and assist the villagers by collecting the forms and sending the applications.



Image 3: The new RISDA supported rubber plantation

The cocoa scheme is a form of contract farming whereby each household that gets accepted to the scheme receives a one-time payment of RM 1,700 for clearing and preparing the land for the new cultivation. Thereafter, the households manage the cultivation and the contracting company will come every second month to buy the fruits for approximately 8 RM per kilo, which is perceived as a good price, especially since they are counting on receiving income all year around. In the pineapple scheme, the government will clear the land and prepare a drainage system. Thereafter the land will be managed by the household. Both of these schemes are limited to a specific number of households, meaning that all can apply but just a few will get accepted. The villagers generally view schemes positively and believe they could lead to a higher household income. However, that is based on what they have heard from others and since none of them have harvested nor had any income from schemes, they cannot say how it actually works. So far, there is some frustration around the lack of information and the long process of the application. Neither the ones that have been accepted nor the ones

that have been rejected know the reasons for it. The criteria for the schemes are not public and consequently not known by the applicants. Furthermore, some of the applicants say that they have been waiting for years without getting any answer, but are still encouraged to continue to apply by the Department of Agriculture.

Under the RISDA scheme, rubber is being replanted in the area. The old rubber trees were unproductive and were not tapped for several years. Their replacement began after the construction of the road, probably since it is easier to transport the machinery and other equipment needed. One respondent perceives the RISDA scheme as the biggest change in the village due to the road. The scheme includes a five year contract in which a company paid by RISDA clears the land, builds terraces, plants the seeds, maintains the seedlings and provides fertilisers and pesticides. The project consists of two phases and is located in the forest area, one on each side of the river. The first phase covers an area of approximately 50- 60 hectares. With the exception of a few trees that remain for nutrient and erosion control, the old rubber trees were cleared in 2016. The work has been done by Indonesian migrant workers employed by the company. The second phase will take place on the other side of the river. At this location they will not only replace old rubber trees but also clear new land to be able to expand the rubber cultivation. Five years after they have been planted the trees will be ready to be tapped and will then be managed - tapped and processed. Some villagers fear that they will be stuck with a loan to pay since they believe that the investment has to be paid back, whilst others believe that the scheme is financed by the government.

For the establishment of the mentioned cash crops, fallow land is being cleared. Villagers distinguish between three types of fallow land: Tamuda that has been left fallow between two and ten years; Damud that has been left fallow between 10 and 25 years; and Tmbaway that has been fallow for more than 25 years. Aside from the expansion of agricultural land among smallholders, there are also other land investments in the area. In the district office of Simunjan, land tenure is perceived to be the main issue in Entanggor. In the questionnaire, only seven out of 37 respondents claim that they have land titles on part of their land and no one has a land title for all of their land. The ancestors of the Entanggor residents moved to the current location more than 200 years ago (Dunging). According to the land code (Laws of Sarawak, 1958, chapter 81), a land title may be granted for Native Customary Land if NCR have lawfully been created prior to the first day of January 1958. Until a document of title has been issued, land is considered to be State land (Laws of Sarawak, 1958, chapter 81). The Brooke monarchy gave an oral recognition of the Entanggorians land as NCR. Entanggor villagers therefore qualify to have land titles. The village has applied to the Land and Survey Department of Sarawak several times over the years to get a document of title, but are yet to receive any answer. There is a big difference between NCR-status and land title. NCR-land can only be sold among villagers and they have no power or say over the future use of the land. Whilst land with a title can be sold to outsiders and gives the villagers more power over their land. The few villagers that have land titles on part of their land, were given them by the Agriculture Department of Sarawak when being accepted for the rubber and pepper planting scheme.

The district officer of Simunjan sees large scale investments in rural areas as an important driver for transformation and development, which is needed to eliminate poverty and reach the goal of being a high income country by 2020. He explains that there are several ways in which companies can be given land in a village. If a company gets invited by a village, the villagers will get part of the profit from the company's activities in that village. But if the company is accepted by the government the villagers will not get any compensation at all. The villagers will however, according to the district officer, gain since the investment will contribute to job opportunities for them. The government usually accepts applications of land in forest areas. That is because forest areas have no future since they don't generate money.

Next to Entanggor, in the village of Kesindu, two companies that together hold the second biggest oil palm plantation in Sarawak, are present. The employees are Indonesian migrant workers and the locals are not interested in getting employment at the plantations. The companies have recently expanded their plantation and encroached onto five plots in Entanggor. The villagers have however neither been asked for permission nor received any compensation for the land. According to some villagers, this occurs since the government gives permission to investors by looking at satellite pictures. In these pictures, the land looks like forest that is not used. In reality, the land is used by the villagers which can be seen in their own maps. The villagers have protested and pursued the case in court, which is very costly. The court hearing will be held in the end of April. Aside from that, the villagers have also organised themselves together with other Iban villagers and protested against companies taking their land. The first manifestation was held in Kuching on the day of the indigenous rights in 2013 and has been a tradition every year since then. However the number of participants has decreased due to lack of funding. The villagers are not against the plantation itself, but are protesting against the manner in which the land has been taken from them. Many villagers are on the contrary expressing a positive attitude towards oil palm, provided that the scale is moderate, the land is under their title and that the profit is theirs. At the same time, villagers are also expressing that it is important to not clear all the forest and above all they want to keep the heritage for the generations to come.

The Road's Influence on the Villager's Capital Assets

Physical Capital

One of the most significant physical capital gains for the village has been the road, completed in 2013. Entanggor's access to physical capital increased with the construction of the road, as raw materials and equipment have become far more easily accessible from the nearby towns. The types of physical capital that the village uses include construction materials, agricultural equipment and electricity. The greater access to these products and facilities has resulted in improved living standards, more disposable income and a shift in work and building practices. For instance, traditional houses built of Belian are now being replaced by cement buildings, which are cheaper and easier to build and so increasingly becoming the popular option

amongst villagers, when possible. Old roofs built from Belian which had lasted 100 years, are now being replaced with new roofs built from plastic or zinc, due to convenience. The new cement houses can also be viewed as a status symbol, showing the owner's wealth. By shifting from reliance on forest materials, villagers could be viewed as less vulnerable, however with a reduced incentive to preserve such tree species for their own use, the future prosperity of the forest could be under threat. Also, villagers have greater access to agricultural equipment through indirect means via schemes that provide such equipment. This allows for the labour intensive nature of agricultural work to be reduced.

Natural Capital

The villagers of Entanggor are to a very large extent dependent on natural capital for their livelihoods. The natural capital that they have access to and use consists of the land where they are cultivating subsistence and cash crops, as well as the forest that they use for hunting, fishing and collecting fruits, vegetables and construction materials. The forest also provides them with ecosystem services, such as clean water. Livelihoods with a large dependence on natural capital are generally seen as vulnerable to shocks (Sustainable Livelihoods, 2003, p. 11). In this sense the road enables people to engage in other activities, thus diversify their livelihoods and decrease their vulnerability.

The road is also opening up for a greater variety of on- and off-farm activities. It seems to be a contributing factor for several new schemes, including RISDA, being introduced in the village. These new activities do also imply a change in the way natural capital is used and managed. On one hand, these activities imply a land use change; the new opportunities contribute to the transformation of secondary forest in the form of fallow land that is part of the traditional swidden agriculture to conventional farming plots. This transformation started before the construction of the road but the data collected in this study shows that it is enhanced by the road since people are choosing to clear old fallow land for cultivating new cash crops. The new cash crops are also related to conventional agricultural practices. Synthetic herbicides, pesticides and fertilisers are provided as part of the schemes and the crops are usually planted in monoculture. Aside of the small scale agricultural activities of the villagers, Entanggor is also attracting investors from outside. The large scale monoculture oil palm plantation is expanding and people are also witnessing an increased interest of new investors, possibly due to better communications, including opportunities of transportation. The clearing of forest and potential environmental impacts, such as soil erosion and impacts on the water quality, of conventional agricultural practices could be seen as decreasing the natural capital access.

On the other hand the road can be seen as enabling people to make more efficient use of the natural capital since they can use the land for growing crops that would otherwise not be used. The reason why the road is enabling that is the access to markets, directly or indirectly, for example through the contracting companies that are part of some of the schemes. These new opportunities of using the natural capital is generating multiple benefits such as increased financial capital (income from the cash crops) that in turn leads to increased human capital

(since the money can be invested in education or food). This could in the longer term lead to less dependence of the natural capital and one could argue that the villagers would be less vulnerable and better equipped to cope with potential negative environmental impacts by then. However the importance of natural capital goes way beyond the dependence on resource-based livelihood activities. Key environmental services and food produced from natural capital is essential for the survival and health of all human beings (Sustainable Livelihoods, 2003, p. 11). Presuming that the current trends continue, the resilience capacity and thus the key environmental services will be threatened, but a larger independence from natural capital could also decrease the incitements of protecting the forest.

Another aspect to be considered when analysing people's access to natural capital is land tenure. Until now legal rights, or ownership, have not been needed to access land. However, this might change since the interest of land acquisition seems to be increasing and land becoming more vulnerable. Land rights can also be seen as an institution that order society and mediates livelihoods (Jakimow, 2013). Institutions can *"shape the ways in which differentiated actors access, use and derive well-being from environmental resources and services"* (Leach et al., 1999, p. 232). It may thus also have an impact on social capital where people with land title may have more power than those without and those who have no land rights might be excluded from certain groups and disadvantaged in a variety of ways (Sustainable Livelihoods, 2003, p. 9). Such inequality might be created in Entanggor if: companies get permission by the government to lease land in Entanggor and are given legal rights to land that the villagers perceive as theirs; some of the villagers also gain land titles, as a consequence of the schemes that they are part of; meanwhile others are left aside. It is therefore essential to recognise people's land and give them formal land titles.

Economic Capital

Malaysia's economic strategy for development "Anchoring Growth on the People" (Eleventh Malaysia Plan 2016-2020) is having a significant impact on the livelihoods of the nation's people in both urban and rural areas. Entanggor is undergoing a definite shift in its economic strategy as the development of the new road and the Malaysian development plan puts increased pressure on people and their land to generate cash rather than subsistence crops and crafts. The nation has its sights on achieving high-income status by 2020 and this means that villages such as Entanggor that have traditionally focused on subsistence agriculture and cultural activities are shifting their attention to the wider global market. A number of key economic transitions are underway at this time, many of which are in their fledgling stages, and all of which, in theory, result in a greater influx of cash into the community.

These economic transitions include :

- A marked shift from the cultivation and procurement of traditionally relevant food products such as rice, vegetables, fruit, wild meat, and wild plant species to crops which are relevant to global markets and government schemes such as oil palm, rubber, pepper, and cocoa

- Financial savings on energy consumption due to electricity access
- Access to banks
- Government pensions and income support

We will further illustrate two of these economic transitions in the interest of brevity. Traditional agriculture, traditional crafts, and foraged products are still abundant at this time but interviewees stated that the means of exchange for these products is gradually shifting from reciprocal exchange and bartering to exchange for cash. At this point the shift seems to have little negative impact on local food security but in the long term market fluctuations could result in financial stresses as imported food and other products decrease in affordability. Subsistence production provides a buffer from market price fluctuations, as the community collectively fulfills its nutritional needs through agriculture and foraging practices.

Many households pay nothing for electricity due to government incentives meaning that time and cash resources are used in other ways, primarily for purchasing products outside of Entanggor. The influence of the cash economy (and the road) could be seen on a funeral ceremony which took place while we visited. The tradition of harvesting forest and agricultural products from the valley for ceremony was usurped by the purchase of products from nearby Sebuyau markets; although some of the older women produced a traditional dish, bamboo stuffed with various forest vegetables and herbs, for the final ceremonial meal.

Social Capital

The recently completed road to Entanggor has been heralded by the majority of community members for its myriad of benefits. One of the most widely applauded impacts is connection to friends and families outside of the community, and for those living outside of the community to return. One family we spoke with moved back to the community after the road was completed noting that it was a key factor in their decision to return. They now hope to share the community with others by opening a guesthouse on their property. They feel the region has potential for tourism, particularly for those interested in a retreat outside of urban centres.

Accessibility to outsiders allows residents to stay connected to the rest of the country and the former members who have departed for higher education and careers with higher economic returns than agriculture. Some interviewees noted recent travels to Kuching or other destinations where children, friends, and family had emigrated. An interesting outcome of this connection arose in regards to a network formed amongst former Entanggor residents who had departed after their youth to pursue roles such as doctors, politicians, and military officials. The network of relatively influential individuals have been discussing their return to Entanggor for retirement and are therefore re-engaged with the politics and development initiatives of the area. Returning villagers with high levels of education and political experience could influence future decision making and legal representation on behalf of Entanggor.

Human Capital

Villagers' access to facilities that strengthens human capital has increased thanks to the road. They have greater access to health care - which is probably a significant benefit due to the demographic of the village - and to higher educational institutions. Furthermore an increased financial capital could be invested in greater forms of education for the younger generations. New knowledge is also introduced to people through government support, regarding new cash crops. However some knowledge can be highly useful for production but be negative in terms of its effect upon the environment (DIFID, p. 8). To avoid a negative impact on the natural asset it is therefore important to also provide information on sustainability issues related to the new crops.

As some aspects of human capital seem to increase, others seem to decrease. A villager expresses that the skills and knowledge of how to survive in the village and forest is being lost when people emigrate. This trend seems to be enhanced by the easier access to markets since people choose to buy things instead of making them by themselves. This happens with everything from food to basket weaving and house construction. However, human capital is necessary for achievement of positive livelihood outcomes, since it is required in order to be able to make use of the other four capitals but it is not sufficient on its own (DIFID, p.7). In light of this, the local skillset might be changing to adapt to the current needs that naturally change over time, alongside the activities in which people engage in. A downside with the change observed in this study might be that the decreased knowledge and use of the forest potentially could decrease the incitements for protecting it in the long-term (see natural capital for further discussions). In the long-term, a loss of local skills could have a negative impact on social capital, if traditions are being lost as a consequence.



Image 4: Traditional dance and musical performance during our welcoming ceremony

Some indirect impacts on the human capital are migration and the increased financial capital that seems to be mostly invested in food. Nutritional food is strengthening the human capital. However, apart from buying more fish, the products that people mention as the ones they usually buy are snacks, candies and sugar. These less healthy food habits could potentially impact health and thus the human capital. The labour force in a household is an important factor in human capital and could be impacted by migration. If the emigrants are sending back remittances, they are thought to be considered as household members contributing to the common economy. Thus, easier access to towns and working opportunities might enable a better use of human capital.

Another human capital is to know how the political and legal system works so that they can claim their rights - especially relevant when it comes to land tenure. They seem to be good in organising themselves which is probably, at least partly, thanks to a strong social capital asset. A strong social capital is also benefiting human capital since social networks facilitate the development of knowledge (IFID, p.7-8). Taking into consideration the wide range of (sometimes contradicting) responses regarding their rights, land compensation and the upcoming court case, it seems as though there are only a few that actually know what is going on, which could be an indication of lack of human capital. There is also a lack of knowledge on the requirements and functions of the schemes, which would probably be able to overcome by governmental institutions making a greater effort to create a better flow of information and

more accessible communication channels. Higher levels of formal education in combination with knowledge gained through migration would possibly contribute to overcoming the few challenges on human capital in the future.

Reflections

Methodology

In hindsight, it would have been valuable to conduct a pilot questionnaire with some of the villagers, to enable us to identify topics that needed more clarification (namely land rights) and edit the questionnaire accordingly. Such as, including more questions specifically related to the topic. Also, certain sections of the questionnaire were prone to misinterpretation (including the calculation of income from crops), which in some cases led to inaccurate data collection. A lack of clarity around the specifics of the questionnaire procedure resulted in a loss of a systematic approach, and hence some confusion in the interpretation of the results. In addition, in deciding to split into pairs (to allow for a greater coverage of the village) this added to the loss of systematic procedure as each pair asked questions in different ways. The same could be said for our SSI procedure, as despite creating a question framework, some SSIs were carried out impromptu and without the framework available – as such SSIs did not all follow the same format or cover the same themes.

The setting of certain PRA methods and interviews occurred on the common veranda of the longhouse, which gave the opportunity for other members of the community to freely join the sessions. This made us unable to control the influence of others on the responses we received from the intended participants. We therefore found that it was easier to conduct the sessions in a more enclosed environment, as that also reduced any background noise and distraction.

In addition, we could have taken advantage of our large group size by splitting up into smaller groups from the outset, to complete more research, gain a better level of understanding of the village life and its governance, and optimise time-management. For instance, more emphasis could have been placed on conducting further SSIs, to help to validate the information collected by gaining a larger sample size and so more representative community perceptions and knowledge of the matters at hand.

The forest inventory was not thorough enough to get a full picture of the forest surrounding the village. The three sample plots cannot be said to be representative of the whole area, but gave some insight of the forest structure and diversity, as well as giving the opportunity to learn new methods and gaining knowledge from the SSI carried out with the village forest guide and the botanist from UNIMAS. Furthermore, the tree height measurement was very difficult due to the density of the forest and the hilly terrain, thus making the measurements and the biomass calculations less accurate.

Finally, we and our Malaysian counterparts did not integrate teams for all methods carried out. This could have impacted on the type of data gathered and its reliability, due to our different ways in working and our different language abilities, as two of the Malaysian students were able to understand and speak Iban. In hindsight, it would have been beneficial to ensure that we mixed teams during all methods, to help to minimise the chance of questions and answers being 'lost in translation'.

Approach

In ethnographic research, two key assertions include the need to retain an 'open mind' to avoid ethnocentric biases, so as to allow the local context to influence thinking; and secondly, that by developing a close relationship to those being studied, we are able to gain a valuable and rare insight into the issues and ways of community life (Funder 2005, p. 1603). With this in mind, we aimed to arrive in Entanggor without any preconceived ideas of the community and to remain open-minded to any new experiences that we would encounter throughout our stay. Whilst doing this to the best of our ability, we perhaps allowed our own personal bias and interests to steer the research towards certain topic areas that we perceived to be the defining feature of Entanggor, such as the forest uses and resources, local knowledge and cultural heritage. However, during our stay we gained a greater appreciation of the complexity of community life, and how there are also many political and financial factors that impact community livelihoods that were equally important to understand. As a result, we decided to take a more holistic approach to our research, with the aim to gain data and insights on the various different impacts of the road, instead of focusing on one specific area.

Participatory Group Work

In our Copenhagen University group we worked as a participatory group and we had a cooperative approach (Deutsch 2006 chapter 2), where every group member was encouraged to speak up during our daily evening meetings in Entanggor. Also, differences from our diverse educational and cultural backgrounds were invited in and viewed as a strength. During the initial stages, there was some difficulty in understanding one another and getting all to participate in group meetings. Overtime, this improved although we naturally did not agree on everything, sometimes resulting in long meetings and tired minds. But this in the end ensured the integration of everyone's perspectives and needs, leading to more inclusive solutions with a wider range of vision, as well as a greater sense of shared responsibility towards the task at hand (Deutsch 2006 chapter 2; Kaner et. al. 2011).

The communication in the group process was characterized by having discovery, learning and understanding as the primary goals. This was achieved through active listening, teamwork and valuing individual perspectives.



Image 5: Planning of the group work with our malaysian counterparts

Learning and Group Dynamics

As the the situation on the ground in Entanggor was far more complex than we had imagined before going into the field, our work evolved along the way with our increasing knowledge. The working process in our group can be described by looking at Kaner et al's (2011) Diamond Model of Participatory Decision Making, which is a schematic representation of the stages a group goes through to find a satisfactory solution to the problem at hand.

The five stages in a group decision process according to Kaner et al (2011) are "Business as usual" where obvious solutions are presented, the "Divergent zone" where each group member more subjectively expresses their own ideas, the "Groan zone" where potential conflicts evolve, the "Convergent zone" when a common understanding is reached and finally the "Closure zone" where a decision is made.

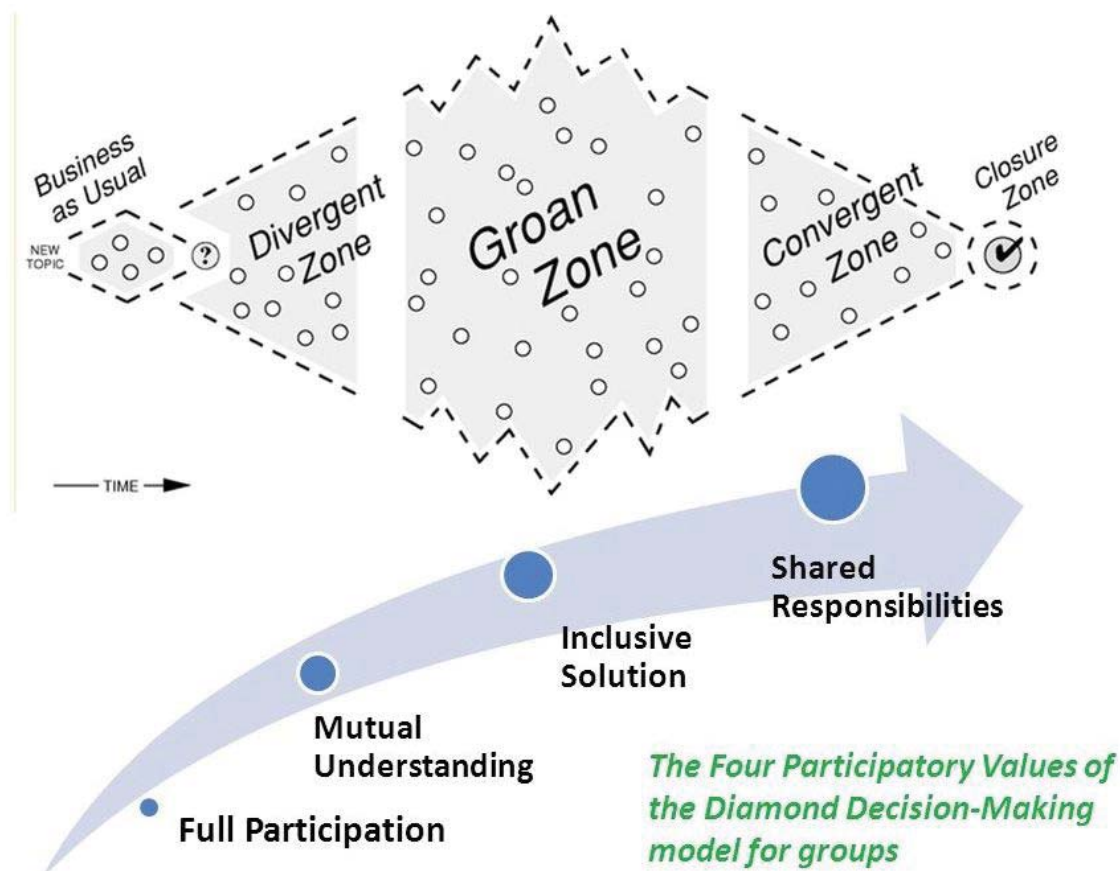


Figure 7 The five stages involved in the group decision process by Kaner et al (2011)

The diversity of the group and each group member's strong engagement resulted in spending a long time in the divergent zone developing ideas on the project. This led to the groan zone, where confusion in the direction of the project arose, due to the many different ideas developed and some conflicts of interests. Yet by following the participatory approach, incorporating full participation and efficient and active communication, we resolved that the road was to be our main focus point. Following on from this agreement, we moved into the convergent zone, dividing the tasks and responsibilities of the closing stages of the project back home in Copenhagen.

Cultural Nuances

Collaboration with our counterparts in Malaysia was overall an incredible learning experience. We shared enthusiasm and resources on a daily basis, and were offered key insights into the functioning of Malaysian society from the students and the villagers. As our Copenhagen University team dug deeper into key community issues, identified explicitly or discretely by villagers, we did notice some discomfort in our Malaysian counterparts. As earlier mentioned, land rights are a tense issue in rural Malaysia where communities who have lived in a particular region in relative isolation for generations are now accessible to both the outside world and

outside economic interests. In Entanggor this has meant a number of attempts, both successful and unrealised, to develop on villager's claimed land. In seeking to better understand the complexities of land tenureship, Entanggor land development, and the impacts of economic activities, such as palm oil plantations, we were met with some subtle and some overt reluctance to discuss these topics further with our Malaysian counterparts.

Conclusion

Our research revealed many complex relationships between the influence of the new road and the national development strategy on the community's livelihood strategies. It is too early to identify how all the capital assets will be affected since many are not yet detectable, but we have discovered some impacts and identified some questions which could be addressed in future research.

Physical capital is increasing as the road itself serves as a catalyst for import and export of goods and people. In the short term we believe that financial capital will increase as production shifts from primarily subsistence to market oriented production. In terms of human capital, access to formal education and health care are improving the lives of villagers. Simultaneously, traditional knowledge of plant medicine, agricultural techniques, and cultural practices are decreasing amongst the youth. Social capital is strengthened within families as people are more easily connected between Entanggor and urban centers, but decreases at the community level as reciprocity is replaced by financial remuneration, and as the youth emigrate. The natural capital such as agriculture has increased as people have easier access to distant fields and forest areas, but the long term sustainability of improved access is still in question. Overall, it seems the pattern in Entanggor follows the overall trend in Malaysia where agricultural economic growth is prioritised, with a potential influence on the life of rural communities who are dependent on the natural resources available. As traditional fallow land is being replaced by monocultural plantations, the villager's future largely depends on who benefits from future development in the region and the global demand for the products that the region supplies.

We have identified questions that could form the basis for future research including, whether a weakening of social capital will affect the efforts of the community to fight for land rights as they have done in the past, or will greater access to other capitals bolster their legal claims? We would also like to suggest future research to investigate people's perception of the development and the potential of different development strategies.

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Interviews

Interview 1: Semi-structured interview with community leaders, 04/03/2017.

Interview 2: Semi-structured interview with the District Officer of Simunjan, 08/03/2017.

Interview 3: Unstructured interview with a teacher and student at UNIMAS, 08/03/2017.

Interview 4: Semi-structured group interview with household members highly engaged in the local community, 09/03/2017.

Interview 5: Semi-structured interview with the Chairman of JKKK, 09/03/2017.

Interview 6: Unstructured interview with government employee, 10/03/2017.

Interview 7: Semi-structured interview with villager highly engaged in the community and with good knowledge on land issues, 10/03/2017.

Interview 8: Semi-structured group interview with household members engaged in several cash crop schemes, 10/03/2017.

Interview 9: Semi-structured group interview with household members engaged in several cash crop schemes, 10/03/2017.

Interview 10: Semi-structured interview with newly returned female villager, 11/03/2017.

Interview 11: Semi-structured interview with newly returned male villager, 12/03/2017.

Interview 12: Unstructured group interview with older ladies, 12/03/2017.

Interview 13: Structured written interview with emigrated villager highly engaged in the Entanggor land issues, 21/03/2017.

Appendix 1: Work division

Work Division		
Chapter	Main Author(s)	Contributing Author(s)
<i>Introduction</i>		
Study Site and Village Context	Andrew	All
Theory	Andrew	All
Objective and research questions	All	All
<i>Methodology</i>		
Approach to the study	Jacob	All
Transect walks	Jacob	All
Questionnaire survey	Jacob	All
Semi-structured interviews with villagers and key informants	Jacob	All
Participant observations and informal conversations	Jacob	All
Resource mapping	Jacob	All
Seasonal calendar	Jacob	All
Future aspirations exercise	Jacob/Hannah	All
Forest inventory and NTFP assessment	Jacob	All
<i>Results</i>		
Context of study site	Hannah	All
Context of people in Entanggor	Hannah	All
Migration	Hannah	All
Facilities	Hannah	All
Forest resources and services	Jacob	All
Cash crops and land pressure	Emelie	All
<i>The road's influence on the villager's capital assets</i>		
Physical Capital	Hannah	All
Natural capital	Emelie	All
Economic capital	Andrew	All
Social capital	Andrew	All
Human capital	Emelie	All
<i>Reflections</i>		
Methodology	Hannah	All
Approach	Hannah	All
Participatory Group Work	Jacob	All
Learning and Group Dynamics	Jacob	All
Cultural divide	Andrew	All
<i>Conclusion</i>	All	All

Appendix 2: Village transect walk



1. Bemban - wild; used for traditional mat and basket weaving
2. Bamboo - wild; construction, poles, shoots as vegetable, storage,
3. Banana - cultivated; fruit, both yellow and red varieties seen
4. Belian - wild; highly valuable hardwood used for construction, produces very few seeds which lay for a year before breaking dormancy and producing a seedling, endangered, protected and highly valuable on the black market "1 billion ringgit"
5. Belimbing - wild; fruit, yellow and incredibly sour
6. Breadfruit - wild; large fruit; also medicinal; locally known as Sukun
7. Cangkuk Manis - vegetable
8. Chili - cultivated spice; said not to be consumed after a woman has given birth for a number of months, rarely used in the dishes served to us-but most likely because we are outsiders
9. Cocoa - cultivated; consumed raw or processed to later produce chocolate; recent rise of production due to government Cocoa scheme
10. Coconut - nut, fibres; cultivated, used for water,
11. Coffee- bean; grown on a bush
12. Corn- cultivated; subsistence crop
13. Dabai - cultivated; Local Olive- fruit

14. Dragonfruit -cultivated; fruit
15. Durian, wild; fruit, served fresh and fermented; when prices are high locals will sell this crop
16. Gerundang -wild; wood for furniture, construction
17. Guava - cultivated; fruit
18. Jackfruit - wild; fruit and timber
19. Kepayang - wild; fruit can be used after soaking in water for several days
20. Kecipak - wild; green leafy vegetable
21. Letup - wild; fruit, name means burst, like when you press the fruit, also the fruit will burst to spread its seed if left undisturbed
22. Mango - cultivated; subsistence fruit
23. Mangosteen- wild; fruit
24. Menkudu - wild; medicinal plant
25. Meranti, red - wild; string and wood used for construction and boats
26. Miding- wild; fern shoots as vegetable
27. Pepper - cultivated; berries produce a common spice, widely cultivated as a cash crop
28. Paku kubuk- wild; edible ferns
29. Pelait - wild; tree, sap for bird traps, wood for figurines
30. Pineapple - cultivated; fruit, often sold as cash crop
31. Pomelo - cultivated; fruit, subsistence crop
32. Padi, swamp - cultivated; rice, Iban word-asik, cornerstone of culture, diet, society, and economy; Gawai celebration occurs at the end of an intense period of rice harvest; used for food, alcohol, cash
33. Rubber - cultivated; sap tapped and sold as a cash resource, price fluctuates significantly causing periods of time where people do not tap their trees; seems to be self seeding in certain parts of the forest although originally a non-native species brought from Brazil by the British
34. Durian Belanda - wild fruit; also known as soursop or sour durian
35. Starfruit - cultivated; fruit
36. Sugarcane - cultivated; for sugar and juice
37. Tapioca - cultivated; also known as cassava root vegetable rich in starch, leaves used as vegetable
38. Turmeric - roots as spice and medicinal, leaves for wrapping of fish or rice; leaves for making salad, roots for post-natal
39. Ulam Raja - wild; green vegetable
40. Umbut - wild; heart palm as vegetable
41. Water Apple - fruit
42. Yam - root vegetable
43. Lime-cultivated; fruit,
44. Papaya- cultivated; fruit, high in glucosamine, ripe while we were here



Appendix 3: Forest transect walk



Appendix 4: Questionnaire

Village: _____ Respondent code: _____

Section A: Demography Background - Head of Household

1. Gender: ☐ Male ☐ Female
2. Age: _____ years old
3. Marital status: ☐ Single ☐ Married ☐ Divorced/Widow/Widower
4. Race: ☐ Malay ☐ Iban Others (please state: _____)
5. Education level: ☐ No Schooling ☐ Upper Secondary School
☐ Primary School ☐ College/Institute
☐ Lower Secondary School ☐ University

Section B: Household Information

6. How many members are there in the household: _____
7. Number of dependents: _____
8. Any family member/s left the village/migrated? ☐ Yes ☐ No

Section C: Job and Income

Agricultural Sector

9. Do you do any agricultural activities?
☐ Yes ☐ No (proceed to Question 17)
10. Is the agricultural sector your main source of income?
☐ Yes ☐ No

11. Please list the yields of your plants, their uses and revenues.

No	Type of crops	Own use (✓/X)	To sell (✓/X)	Revenue (RM/kg/tonnes per week/month/year)	Affected by flood (✓/X)
1	Banana				
2	Pepper				
3	Paddy				
4	Oil palm				
5	Rubber				
6	Coconut				
7	Pineapple				
8	Home garden				
9					
10					

12. What is your income from agricultural products (approximately)?
RM/Month _____

Forest Product Sector (Non Timber Forest Product)
(only for respondents who collect forest products and hunting)

13. Do you use/sell non timber forest products or/and hunt?
☐ Yes ☐ No (proceed to Question 21)

14. Type of forest products:

Type of forest products	Own use (√/X)	To sell (√/X)
Wild Vegetables		
Medicinal plant		
Wild Fruits		
Wild animals		

15. What is your income from non-timber forest products (approximately)?
RM/Month _____

Fishing Sector
(only for respondents involved in fishing)

16. Are you involved in fishing activity?
☐ Yes ☐ No (proceed to question 24)

17. List all of your fishing product and yields.

Type of fish	Own use (√/X)	To sell (√/X)	Revenue (RM/kg)
Fresh water fish			
Sea water fish			
Prawn			
Crab			

18. What is your income from fishing activity (approximately)?
RM/Month _____

Non Agriculture / Non Fishing / Non Forest Product Sector
(only for respondents working in other fields)

19. How many household members are working (regular salaried job)? _____
20. Sources of off farm income :

Source of income	Tick (✓/X)
Government sector	
Private sector	
Own business	
Pension	
Government aid	
Others (please state)	

21. What is your total income from all off-farm work (approximately)?
RM/Month _____

Section D: Land Ownership and Uses

22. How much land area do you have:

Uses	Land area (acre)
Agriculture activity	
Fallow land	

23. How large is the area of titled lands (grants) and do not have a title?

Land status	Land area (acre)
With land title	
Without land title	

24. The origin of the land ownership status:

☐ Inherited ☐ Bought ☐ Borrowed

Section E: Residential Information

25. House ownership : ☐ Own house ☐ Rental
☐ Lodging with relative or other family

26. Water supply : ☐ Treated water ☐ Well
☐ River ☐ Rain

27. Power supply: ☐ Electric ☐ Oil lamp
☐ Generator ☐ Others (please state) _____

Section F: Ownership of Vehicles and Equipment

28. Do you own vehicles and equipment as such:

Vehicle/ equipment	Yes (✓) / No (-)	Total (unit)
Car		
Van		
Lorry		
Motorcycle		
Bicycle		

Boat (with engine)		
Boat (with no engine)		
T.V		
Radio/Video player		
Refrigerator		
Fan		
Gas stove		
Computer/Laptop		
Mobile phone		
House phone		

Appendix 5: Interview guide

Themes for semi-structured interviews

The following themes are aimed to be explored in the semi-structured interviews with the households. However, the same themes - or a selection of relevant themes - could also be used for the interviews with the different key informants. The questions under each theme should be seen as ideas of what could be explored under the certain theme and not as specific questions that are going to be asked. In contrary, the questions are intended to be flexible for fitting each respondent and the issues he/she brings up. Potential key informants are representatives of the village committee (JKKK), villagers engaged in specific activities that we would like to investigate, officials working with infrastructure in the area or with forest management, villagers that are part of forest groups, the medicine man (shaman) of the village, elderly that can recall how the village has changed over time, youngsters that could share their future dreams with us among others.

Respondent background

- Livelihood activity, age, gender and educational level.
- (How long have you been living in Kampung Entanggor?)

Agriculture, cash crops and government schemes

- How long have you cultivated the cash crops for? What did you grow at the land before you switched to the certain crop?
- Why did you choose to grow the certain cash crops? How does it impact your income?
- Do you believe that wishing to cultivating more cash crops will generate higher cash income? If so, what are you planning to use the increased income for (i.e. education, health care, house etc.)?
- Are you part of any government scheme or getting any other subsidies? If so, which schemes? Have you applied for or are you planning to apply for any other schemes?
- Have you been rejected from any scheme? If so, why? What are the criteria? How is the application process?
- Who introduced the crops (i.e. government official, landowner, etc.)? If someone introduced them, did these crops meet the expectations/perceptions which the introducing party's described?
- What kind of agricultural practices do you use for the certain crops? What do you think about them? Crop rotation (fallow), monoculture, herbicides, pesticides and fertilizers. How were they introduced?
- Are you facing any stresses related to the cash crops? Other challenges?
- Who is doing the actual work related to the cash crops?
- Is there any activity that you would like to engage in to a larger extent? Why?
- How do you water your crops (rain water/river?)? Do you encounter any problem with the irrigation system?

Forest and ecosystem services

- How is your relationship to the forest? Is the forest important (forest products consumed direct or indirectly as well as ecosystem services as water)?
- Have you replaced any products that you previously got from the forest with products available on the market?
- Does your access to financial capital affect your preference? Do you think that your use of forest products would change if you engage more in cash crop activities and earn more money?
- Are there any emotional or spiritual elements connected to the forest? Has the forest area decreased? What is the cause(s) of this?
- Are their outsiders using the forest for different purposes?
- How do you perceive the water quality?
- Have you noticed a change in species present in the forest and river?
- Do you perceive any impacts on the environment? Ecosystem services (like less fish in the river because of pesticides)? Erosion? Biodiversity?

Food sovereignty

- What do you normally eat? How much of that do you buy, cultivate and select from the forest?
- Which forest and agricultural products do you use for subsistence?
- Are there shortages of food at any period of the year?
- Is there something that you would like to be able to consume to a larger extent?
- (If they have diversified their livelihoods in some way recently, does that impact their food habits?)

Migration

- How has the population and demographic of the village changed lately (last five years)?
- Do you think that there are any benefits or disadvantages connected to the certain demographical changes?
- Do you think that emigration could impact the future of traditional knowledge?

Road

- How is the road impacting your everyday life? Is there something that you perceive that you have easier access to because of the road?
- Has it any impact on the access to markets, educational or health care institutions? If so, how?
- Has the road had any impact on which crops you are growing or which activities you are engaged in?
- Has the road changed the use/sale of forest products? If so, how?
- Has the road changed the use/sale of agricultural products? If so, how?

Education and health

- Do you and the other household members have access to education?

- Do you and the other household members have access to medical care?
- Do you use both natural and modern medicine? Do you have any preference? Why?
- Has your access change in any way since the road was built? If so, in which ways?
- Do you believe that switching to cultivating more cash crops will generate higher cash income? If so, what are you planning to use the increased income for? (Already asked under cash crop? If so, relate!)
- If they perceive education as important and something they want to “give” their children: Why? Do you think that higher education enables to choose among a wider range of activities? Would you like to be doing something else for making a living if you could choose? What do you wish for your children?

Electricity

- When did you get electricity? Is there any relation to the construction of the road?
- How does it impact your life and activities? Do you do anything differently since you got electricity?

Use of natural resources by non-villagers

- Do you perceive that people that do not live in this Kampung are taking natural resources from the village?
- Is it easier to do so now when the road connect the village with other villages and cities?
- Are there any investments managed by non-villagers in Entangor? If so, what kind of investments?
- Was the land used by anyone else before? Did they have NCR? Land title? Where the villagers asked?
- Do you feel happy with your NCR-status (does it offer a good level of protection)?
- Can you show the borders of the village?
- Is the oil palm plantation next to the village part of Entangor?
- Do you know who is managing the oil palm plantation next to the village?
- Do you have any relation to it? Do you perceive that it impacts you in any way?
- What was the land used to before? Who does it belong to? Did they ask the village or the people previously using the land for permission?
- What relation do you have to the managers and workers of the cultivation?
- Do you know anyone working there?
- If you experience or would any negative impacts, is there any way you could complain?
- Are you or do you know anyone that have an employment related to the plantation? If so, what does a normal working day look like and what are the conditions (working hours, income/salary, protection, vocation, parental vocation, pension, complain mechanisms etc.) What kind of contract do they have? Do they get any benefits? What do they think about their employer?
- Are there any other large scale investments initiated in the area?
- Do you think that this kind of investments could bring any benefits or disadvantages for the

villagers of Kampung Entanggor?

- Do you think that this kind of investments could become more common because of the better communications?
- Do you think that they are a threat to the forest?
- Do you think that a higher pressure on land could change the way of doing agriculture in the long term? Shifting cultivation?

Relations to physical institutions

- What is your relation to the municipality or other bodies of governance?
- Do you know where to go if you have any complains of ideas of development?
- Do you feel that you are being listened to? Do you perceive that your voice is heard?

General reflection questions

- What are the main challenges? Are there any challenges related to the cash crop/forest activities?
- What would be your main aspiration for the future?
- Is there a conflict interest between the forest activities and the cash crop activities?
- Would you choose different livelihood strategies if you could start over?
- Has the quality of life changed in any ways during the recent years? If so, why and in which ways?
- How do you perceive your quality of life if you compare with your parents or how it was when you were a child in comparison with how it is for your children today?

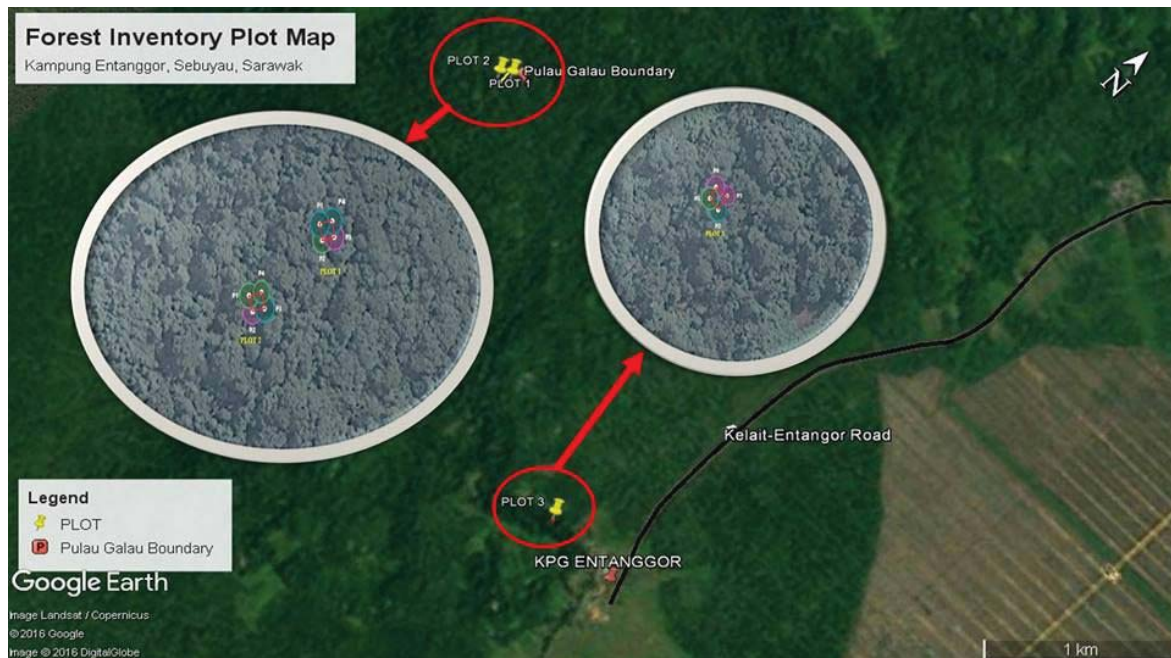
Appendix 5: Resource mapping



Appendix 7: Children's future aspirations



Appendix 8: Forest inventory



Forest data analysis

Plot 1 (Pulau Galau)

Species name	Family	Local Name	Dbh	HT	AGB
<i>Scolapia sp</i>		Manding	9	12.5	27.8140815
<i>Scolapia sp</i>		Manding	10	12.5	34.1360375 2
<i>Pternandra sp</i>		Puluk	24	13	187.921553 7
<i>Diospyros sp.</i>	Ebenaceae	Kayu Malam	13	12.5	56.8737122 7
<i>Timonius</i>		Rentap	30	13	290.526669 7
<i>Palaquium</i>		Nyatuh	33	10	349.979822 2
<i>Palaquium</i>		Nyatuh	13	6	56.8737122 7
<i>Eusideroxylon zwagerii</i>	Myrtaceae	Belian	12	8	48.6682472 7
<i>Brown Lowia</i>		Baru Bukit	19	13.75	119.136649 2
<i>Dilinia</i>		Timpuh	72	30.75	1609.57773 1
<i>Ixonanthes</i>		Tinggi Burung	85	25	2227.86126 1
Not identified		Kak dona	30.5	15	300.059272 8
<i>Shorea sp</i>		Meranti	37.5	15	449.290535
			388	187	5889.29208 3
		Average	29.84615 38	14.38461 54	

Plot size (10 x 10) meters = 100

1sq.m: $5889.30 \div 100 = 58.89$

1 ha: $58.89 \times 10000 = 588900$

$588900 \div 1000 = 588.9$ metric tons dry weight above ground biomass

Area	Plot	No. of Species	Average DBH (cm)	Diversity Index
Pulau Galau	1	11	29.85	-3.76
	2	9	34.17	
Cultivated Forest	3	11	28.58	-2.82

Plot 2 (Pulau Galau)

Species name	Family	Local Name	Dbh	HT	AGB
<i>Brown Lowia</i>		Baru Bukit	50	29.7	788.5103 9
<i>Myristica sp</i>		Kumpang Pendarahan	55	28	950.1239 5
<i>Scrodocarpus</i>		Bawang Hutan / kesindu	25	7	203.5073 9
<i>Sydnocarpus</i>		Senumpul	61.5	42	1182.244 6
<i>Shorea sp</i>		Meranti	11	9	41.08826 6
<i>Nephelium sp</i>		Rambutan hutan	12	7.5	48.66824 7
<i>Parashorea</i>		Urat Mata	70	50	1523.206 2
<i>Baculia Anulata</i>		Pokok ucong	10	8	34.13603 8
<i>Eusideroxylon zwagerii</i>	Myrtaceae	Belian	13	14.5	56.87371 2
			307.5	195.7	4876.617 7
		Average	34.16666 7	21.74444 44	

Plot size (10 x 10) meters = 100

1sq.m: $4876.6177 \div 100 = 48.76$

1 ha: $48.76 \times 10000 = 487600$

$487600 \div 1000 = 487.6$ metric tons dry weight above ground biomass

Plot 3 (Forest)

Species name	Family	Local Name	Dbh	HT	AGB
<i>Durio zibethanus</i>	Bombacaceae	Durian	37	25	437.657222
<i>Lansium domesticum</i>	Meliaceae	Langsat	6	17	12.6601477
<i>Mangifera indica</i>		Mempelam	12	11	48.6682473
<i>Garcinia mangostana</i>		Manggis	23	12.5	172.943918
<i>Garcinia mangostana</i>		Manggis	26.5	17.5	228.024379
<i>Durio zibethanus</i>	Bombacaceae	Durian	38	30	461.073284
<i>Durio zibethanus</i>	Bombacaceae	Durian	53	33	883.707593
<i>Octamales sp</i>		Benuang	95	60	2770.33325
<i>Artocarpus dadah</i>		Dadak	30	30	290.52667
<i>Baccaria angulata</i>		Belimbing merah	20	15	131.67071
<i>Baccaria lensionata</i>		Rambai	6	5	12.6601477
<i>Canarium odontophyllum</i>	Burseraceae	Dabai	15	20	75.1529993
<i>Tabreoma cocoa</i>		Koko	10	15	34.1360375
			371.5	291	5615.48971
		Average	28.576923	22.384615	

Plot size (10 x 10) meters = 100

1sq.m: $5615.48971 \div 100 = 56.15$

1 ha: $56.15 \times 10000 = 561500$

$561500 \div 1000 = 561.5$ metric tons dry weight above ground biomass

Pulau Galau Diversity Index (2 plots of 10 x 10 meters)

Species	Local name	Tot no. of indiv sp	Proportion ratio	Diversity Index
<i>Artocarpus sp</i>	<i>Terap</i>	1	0.021276596	-0.081918034
<i>Anisopilia sp</i>		1	0.021276596	-0.081918034
<i>Antidesma sp</i>		1	0.021276596	-0.081918034
<i>Ardian sp</i>	<i>Patah dahan</i>	1	0.021276596	-0.081918034
<i>Arthophyllum sp</i>	Tumbuh kelapa	1	0.021276596	-0.081918034
<i>Baculia Anulata</i>	Pokok ucong	1	0.021276596	-0.081918034
<i>Brown Lowia</i>	Baru Bukit	2	0.042553191	-0.134340443
<i>Dacryodes rostrata</i>	<i>Kemayau</i>	1	0.021276596	-0.081918034

<i>Dilinia sp</i>	Timpuh	1	0.021276596	-0.081918034
<i>Diospyros sp.</i>	Kayu Malam	1	0.021276596	-0.081918034
<i>Eusideroxylon zwagerii</i>	Belian	2	0.042553191	-0.134340443
Ganeothalamus sp		1	0.021276596	-0.081918034
Not identified	<i>Girak</i>	1	0.021276596	-0.081918034
<i>Glochidion</i>	<i>manyam</i>	1	0.021276596	-0.081918034
<i>Goniothalamus sp</i>	<i>Selukai besar</i>	1	0.021276596	-0.081918034
<i>Ixonanthes</i>	Tinggi Burung	1	0.021276596	-0.081918034
<i>Ixora sp</i>		1	0.021276596	-0.081918034
<i>Kak dona</i>	Kak dona	1	0.021276596	-0.081918034
<i>Lepisantes</i>	<i>Engkelili</i>	1	0.021276596	-0.081918034
Mata ulat	<i>Mata ulat</i>	1	0.021276596	-0.081918034
Monocarpia sp		1	0.021276596	-0.081918034
<i>Myristica</i>	Kumpang Pendarahan	1	0.021276596	-0.081918034
<i>Nephelium sp</i>	Rambutan hutan	2	0.042553191	-0.134340443
<i>Palaquium deccuren</i>		1	0.021276596	-0.081918034
<i>Palaquium</i>	Nyatuh	2	0.042553191	-0.134340443
<i>Parashorea</i>	Urat Mata	1	0.021276596	-0.081918034
Parashorea sp		1	0.021276596	-0.081918034
<i>Parkia speciosa</i>	<i>Petai</i>	2	0.042553191	-0.134340443
<i>Polyalthia sp</i>	<i>Semukau</i>	1	0.021276596	-0.081918034
<i>Popowia</i>		1	0.021276596	-0.081918034
<i>Pternandra sp</i>	Puluk	1	0.021276596	-0.081918034
Rosmania sp		1	0.021276596	-0.081918034
Saurauria sp		1	0.021276596	-0.081918034
<i>Scolapia sp</i>	Manding	2	0.042553191	-0.134340443
<i>Scrodocarpus</i>	Bawang Hutan / Kesindu	1	0.021276596	-0.081918034
<i>Shorea sp</i>	Meranti	1	0.021276596	-0.081918034
<i>Stemonorus</i>	<i>Segerak</i>	1	0.021276596	-0.081918034
<i>Sydnocarpus</i>	Senumpul	1	0.021276596	-0.081918034
<i>Timonius</i>	Rentap	1	0.021276596	-0.081918034
<i>Ubah sp</i>	<i>Ubah midin</i>	1	0.021276596	-0.081918034
Willog begia	<i>Akar kubal</i>	1	0.021276596	-0.081918034
<i>Khema</i>	Pendarahan	1	0.021276596	-0.081918034
		47		-3.755091888

BLUE - Plot 1 (tree)

GREEN - Plot 2 (tree)

RED - Med. Plant (plot 1)

PURPLE - Med. Plant (plot 2)

Cultivated forest Diversity Index (10 x 10 meters)

Species	Local name	Tot no. of indiv sp	Proportion ratio	Diversity Index
<i>Artocarpus dadah</i>	Dadak	1	0.045454545	-0.14050193
<i>Artocarpus sp</i>	Terap	1	0.045454545	-0.14050193
<i>Baccaria angulata</i>	Belimbing merah	1	0.045454545	-0.14050193
<i>Baccaria lensionata</i>	Rambai	2	0.090909091	-0.217990479
<i>Canarium odontophyllum</i>	Dabai	1	0.045454545	-0.14050193
<i>Coffea sp</i>	Kopi	1	0.045454545	-0.14050193
<i>Cucur ligo</i>	Lembak	1	0.045454545	-0.14050193
<i>Durio zibethanus</i>	Durian	3	0.136363636	-0.271695022
<i>Garcinia mangostana</i>	Manggis	2	0.090909091	-0.217990479
<i>Ixora sp</i>	Kiantan	1	0.045454545	-0.14050193
<i>Lansium domesticum</i>	Langsat	1	0.045454545	-0.14050193
<i>Mangifera indica</i>	Mempelam	1	0.045454545	-0.14050193
<i>Octamales sp</i>	Benuang	1	0.045454545	-0.14050193
<i>Phyrinium sp</i>		1	0.045454545	-0.14050193
<i>Pimelo dendron</i>	Jering hantu	1	0.045454545	-0.14050193
<i>Rentuspadon motyeli</i>	Plajau	1	0.045454545	-0.14050193

Tabene montana
Tabreoma cocoa

Pele kambing
Koko

1 0.045454545 -0.14050193
1 0.045454545 -0.14050193
22 -2.815204927

FRUIT TREE
MEDICINAL PLANT

Available medicinal plant in Pulau Galau (2 plots of 10 x 10 meters)

Scientific name	Local name (Iban Name)	Uses
<i>Artocarpus sp</i>	Terap	
<i>Antidesma sp</i>	Bernai	Pain killer
<i>Ardian sp</i>	Patah dahan	
<i>Arthophyllum sp</i>	Tumbuh kelapa	
<i>Ganeothalamus sp</i>		Menghalau nyamuk, (eg:insect repellent)
Not identified	Mata ulat	
<i>Monocarpia sp</i>		
<i>Palaquium deccuren</i>		
<i>Parashorea sp</i>	Bilat	
<i>Rosmania sp</i>		
<i>Saurauria sp</i>		
<i>Willogea begia</i>	Akar kubal	Skin disease
<i>Dacryodes rostrata</i>	Kemayau	
Not identified	Girak	
<i>Glochidion</i>	Manyam	Kekejangan otot
<i>Goniiothalamus sp</i>	Selukai besar	Fever, Malaria
<i>Ixora sp</i>		
<i>Lepisanthes</i>	Engkelili	Untuk halau hantu
<i>Palaquium deccuren</i>		
<i>Parkia speciosa</i>	Petai	High blood pressure, diabetis
<i>Polyalthia sp</i>	Semukau	Sore eyes
<i>Popowia sp</i>	Semukau	Sore eyes
<i>Stemonopus</i>	Segerak	
<i>Ubah sp</i>	Ubah midin	Muntah darah
<i>Khema</i>	Pendarahan	

Available medicinal plant in Forest (10 x 10 meters)

Scientific name	Local Name (Iban name)	Uses
<i>Artocarpus sp</i>	Terap	
<i>Coffea sp</i>	Kopi	
<i>Cucur ligo</i>	Lembak	
<i>Ixora sp</i>	Kiantan	
<i>Phyrinium sp</i>	Not identified	
<i>Pimelo dendron</i>	Jering hantu / kelampai	

	sitak	
<i>Rentuspadon motyeli</i>	Plajau	
<i>Tabenemontana macrocarpa</i>	Pele kambing	Kusta



The Kampung_(forest) and The Tanah_(field): Examining Land Use and Livelihoods in Kampung Entangor

Synopsis

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Word count: 2449

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1. Introduction

Livelihood strategies continually adapt to both economic and political influences, by which assets such as land and ownership rights are allocated and re-allocated (Cramb, 2009, p. 278). Sarawak has a long history in small scale cultivation, although this livelihood strategy had seen a dramatic change with the introduction of cash crop cultivation. The new commercial crops were introduced with the establishment of large-scale plantations by the British (Athukorala & Loke, 2009, p. 154-155). Rubber was introduced in 1876, palm oil in 1917 and cocoa in the 1950s. Government policies have encouraged the adoption of such crops through schemes and subsidies (i.e. for fertilisers) (Athukorala & Loke, 2009, p. 154-155). The cultivation of cash crops is highly dependent on market prices. For instance, rubber cultivation increased when market prices rose in 1970s, until government policies shifted the emphasis from rubber to palm oil by distribution of palm oil specific grants (Athukorala & Loke, 2009, p. 154-155). The Chief Minister of Sarawak, Abdul Taib Mahmud (in power during 1981-2014), was a strong supporter of modern, large-scale agriculture and its ability to bring about economic and social development (Cramb, 2009, p. 283-284). Consequently, agricultural schemes that bring together smallholder farmers and large scale agriculture have been adopted through joint ventures, whereby smallholders land is provisionally leased for 60 years and gives companies the right to develop, mostly being palm oil plantations (Cramb, 2009, p. 283-284).

1.1 Study Site and Village Context

Our study site is Kampung Entangor, an Iban village situated in Sarawak in Malaysian Borneo, (Coordinates: N 01 27.105' E 110 52.186'). Kampung Entangor is in close proximity to several other villages, the closest being Kesindu and Lunying, located on the Sebuyau side. More distant villages include Kepayang, Sual and Lukur, on the Simunjan side. The area has a hilly topography and several streams running through the village. (SLUSE Field course 2017, Village Description, Entangor)

Kampung Entangor consists of 80 households, which cultivate swamp rice as their main subsistence crop. The primary cash crops include pepper and rubber, whilst palm oil and cocoa cultivation are only recent developments and not so prolific in the area, as opposed to in other regions in Sarawak. The farming practices in the village are influenced by price fluctuations. For instance, the recent drop in the price of pepper has led to decreased pepper farming and a reliance on rubber tapping which offers a more favourable price at the market. A large majority of the Kampung Entangor village (50 households) participate in the rubber scheme - Rubber Industry Smallholders Development Authority (RISDA) (introduced in 2016). (SLUSE, 2017)

Kampung Entangor has been subject to significant changes in land use, notably the development of cash crops and the relatively new road development, linking Kampung Entangor to the nearby towns of Sebuyau, Sebangsan, Simunjan and also Kuching. Whilst the road has greatly improved transport links, access to markets and healthcare, it also comes with

potential drawbacks. Such as facilitating the expansion of palm oil plantations and illegal logging by external land developers. This threat of palm oil expansion and illegal logging is perhaps of increased importance to Kampung Entangor villages, due to there still being a relatively rich forest area, which is used for non-timber forest products (NTFPs). (SLUSE, 2017)

In Sarawak, there is a state sanctioned political hierarchy, headed by the community leader (Andersen et al., 2016, p. 368). Below the community leader there exists several administrative divisions including the temenggong, pemanca and penghulu who are the representative counterparts for ethnic groups, local communities and longhouse communities, respectively (Andersen et al., 2016, p. 368). The headman (or tuai) is at the base of the Iban political hierarchy and is responsible for the welfare of his own longhouse community (Andersen et al., 2016, p. 368). The Kampung Entangor village is currently without a headman, as the previous headman died in 2016 and they are yet to find a replacement. As a result, community affairs are currently managed by their counsellor and the village committee (JKKK) (SLUSE, 2017).

2. Objective and research questions

Our study objective is:

To identify the diversification of livelihood strategies and determine the related importance of cash crops and forest products in Kampung Entangor.

From this, we have developed three main research questions, with a sustainable livelihood focus:

- 1) What are the livelihood strategies in Kampung Entangor?
 - a. What are the reasons behind the choice of these livelihood strategies?
 - b. How have the livelihood strategies in Kampung Entangor changed over time?
 - c. What are the future livelihood aspirations in Kampung Entangor?
 - d. What are the perceived challenges related to livelihoods strategies?
 - i. How are government schemes viewed?
- 2) What is the importance of cash crops and forest products in Kampung Entangor?
 - a. What are the current resources of importance generated by agriculture, forestry and other methods?
 - b. What have been the resources of importance in the past?
 - c. What products/activities are favoured among villagers?
- 3) What is the impact of the road on livelihood strategies?
 - a. Has increased access to new markets changed the use and/or production of cash crops and forest products?

3. Methodology

3.1 Social science methods

3.1.1 Transect walk village

The community transect walk will help us get an idea of the location and its actors and settings. It will be a structured walk along pre-selected lines through the community and adjacent areas where we will be observing vegetation, changes in physical features as well as different types of resource uses, farming activities, land use practices and cropping systems.

The community transect walk is done together with a few knowledgeable local villagers who can point out different land uses and plant species. We expect to use around two hours for the transect walk and the output of the walk will be a transect diagram.

The tool will provide an overview of the locality and the currently observable situation. Furthermore it serves as an entry point to some of our more in-depth PRA tools like community resource map, community timeline and the seasonal calendar.

3.1.2 Transect walk of forest and adjacent village areas

This tool will be similar in method to the village transect walk, but will be of longer duration of around 3-5 hours.

An initial idea is to start in the lowland fields moving upwards in the terrain recording changes in crops or other land uses of importance to the village. The walk will also be done with a few local villagers who can help point out non-timber forest products and timber species to us as well as other valuable forest products.

3.1.3 Questionnaire survey and GPS-points

We will conduct a household questionnaire to get an overview of the demographic composition and livelihoods of the villagers. Questionnaires enable a large sample and should be short and easy to code (Mikkelsen, 2005, p. 89). To get a representative sample we will survey every third household. A minor pilot study will be conducted prior to the questionnaires distribution, to adjust the inquiry to better fit local circumstances. In connection to the questionnaires distribution, GPS will be used to map the households and thus give a geographical overview of the village. This map will enable analysis of the geographical aspects and their impact (if any) on the livelihood activities or outcomes. The questionnaire and GPS-points could further be used in combination with data selected from other methods for further analysis.

3.1.4 Semi structured interviews with villagers and other key informants

The questionnaire will provide us with information about the livelihood activities but will not help us understand why the certain activities are chosen and which factors that impact the choices. In contrary to the structured questionnaires, semi-structured interviews consist of open-ended questions that allow following up with further questions on relevant issues (Mikkelsen, 2009, p.89). Through the questionnaire we will be able to identify key villagers that we would like to interview in depth but we would also like to interview some random sampled households to get a better understanding of villagers' livelihoods in general. In addition to the interviews on households' livelihoods in general, villagers that are engaged in specific activities that we would like to investigate and other key informants will be interviewed. The themes for the semi-structured interviews are presented in the Appendix 4.

3.1.5 Participant Observation and Informal Conversation

Throughout the study period, we plan to engage in participant observations and informal conversations to facilitate a better understanding of daily practices and events as well as gain insight into social interactions. For example, we hope to participate in market trips, harvesting, and cooking activities. Due to the informal nature of this research method, the findings will be logged in personal field notes and key findings will contribute to our collective research. The acquisition of local knowledge, experiences and perceptions, will be valuable in triangulating our findings from other methods or perhaps in modifying our research focus to better represent the realities of community life.

3.1.6 Focus Group Interviews

Focus Group interviews will be conducted with the Entangor villagers to further develop our understanding of topics of interest that arise during our literature review in Copenhagen or during our initial interactions with the village people. Focus group interviews are considered a Participatory Rural Appraisal tool which aim to incorporate the knowledge and opinions of rural people in the planning and management of development projects and programmes. Example focus group areas of interest could include: 'women farmers' or 'forest committee'. Effectively facilitated focus groups can build a momentum of knowledge sharing amongst participants.

3.1.7 Forest Product Ranking (PRA-method)

Kampung Entangor is unique in the context of this year's SLUSE field school as a significant portion of the community's economic endeavors are related to the products and resources found within the surrounding forest. We hope to better understand the relationship between the villagers and the forest by engaging in a forest product ranking activity. This PRA exercise will involve a focus group of community members involved in the procurement of resources from the forest and asking them to rank the significance of each product which they harvest. Forest products will be ranked using a matrix observing subsistence, market, and cultural value.

3.1.8 Timeline/historical mapping (PRA-method)

Historical mapping is a PRA tool which allows us to observe how land use and livelihoods have changed in recent memory. We will break off into predetermined focus groups and ask villagers to sketch their memories of land use and livelihood activities over time. This could reveal changes such as a shift from swidden agriculture to cash crop production or from wild forest to agro-forestry.

3.1.9 Village and forest mapping (PRA-method)

A village and forest map will be an important PRA tool for understanding the relationship of the village to the resources embedded within and surrounding Kampung Entangor. A village and forest map will be created by various different groups to uncover the differing perspectives of land and land use. Focus groups could include : women, men, elders, community leaders, forest workers, and agriculturalists. GPS mapping will be used to supplement the data collected from focus groups.

3.1.10 Seasonal calendar (PRA-method)

Creating a seasonal calendar allows us to better understand the activities of the villagers on an annual timeline. A seasonal calendar is another PRA tool requiring the input of agriculturalists, and other industrious individuals on their annual economic and subsistence activities. Calendars could vary depending on the activities of the participant, on the climatic and soil conditions of different agricultural areas, and among other factors to be determined. Calendars will be created amongst groups based on gender or occupation. Seasonal Calendars will be sketched along a timeline using symbols and words to represent the various activities of the yearly rotation.

3.1.11 Preference ranking : Livelihoods (PRA-method)

Ranking livelihoods is a PRA tool requiring the input of those engaging in work activities within the village. This tool is intended to improve our understanding of the means for income and subsistence in the Entangor village. Villagers of working age and capability will be asked to rate the importance of the tasks they engage in for subsistence and economy. An example of this process could be a villager ranking pepper farming as number 1, durian harvest number 2, and transporting people in her car for money as number 3.

3.3 Natural resource methods

3.3.1 Forest resource assessment

The Forest Resource Assessment (FRA) will help us describe the forest resources. First we will choose sample plots from defined areas. In the sample plot we will measure the height using a clinometer and diameter using a measuring tape of the trees in the sample plot, which we can

use to calculate an estimated aboveground biomass. In the plots we will also measure the species richness and the evenness (the abundance of the species).

While doing the FRA we hope also to do a NTFP resource assessment of the forest to study which species and products are of importance to the villagers. As we do not possess the specific local knowledge on tree species, we will have to rely on the knowledge of the villagers who know the forest well alongside the expertise of the local Malaysian students.

3.4 Planned collaboration with counterparts

Throughout this field course we will be working in collaboration with a group of five Malaysian counterparts. We will be sharing knowledge, ideas and jointly carrying out certain research methods. As our research objectives and questions have a high degree of overlap, we have identified similar research methods that we intend to carry out. Whilst at Kampung Entangor, we will likely combine efforts on the following methods: semi-structured interviews, forest inventory, preference ranking, livelihood matrix (using PRA methods) and participant observation.

Our joint efforts will be valuable in maximising our time and efficiency. For instance, by dividing semi-structured interviews between several of us, we will be able to cover more households/individuals in a shorter time period – allowing more time to be spent on other methods such as forest resource assessment. In addition, working together will allow us to combine our skills and knowledge and to use our differing perspectives/experiences to collect a greater range of information. This will also help to decrease the chances of our own personal biases/preconceptions influencing the analysis of our findings.

Our Malaysian counterparts have identified water sampling as an additional method. Whilst we do not plan to incorporate this into our study, we will encourage transparency of all results (on both sides) collected during the study period, so that both groups can benefit from additional knowledge of the research site and community.

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5. Appendices

Appendix 1: Table of Applied Methods

Applied Method	Frequency
<i>Social Science Method(s)</i>	
Transect Walk - Village	
Transect Walk of Forest and Adjacent Village Areas	
Questionnaire Survey	
Semi-structured Interviews	
Participant Observation and Informal Conversation	Throughout
Forest Product Ranking	
Timeline (Historical Mapping)	
Village and Forest Mapping	
Seasonal Calendar	
Preference Ranking - Livelihoods	
Focus Group Interviews	
<i>Natural Resource Method(s)</i>	
Forest Resource Assessment	

Appendix 2: Questionnaire draft

The questionnaires will comprise information about the households' members, their access to different capital assets, their livelihood activities and issues of land use. Hopefully, the data from the questionnaire will make it possible to identify the key issues and key informants for further data collection that in turn will give a more in-depth understanding of the mediating and contextual factors behind the livelihood strategies. The following suggestion is the draft that has been sent to the Malaysian colleagues with the purpose to be further edited.

Household composition

- How many infants (0-4 years old) live in the household?
- How many children (5-14 years old) live in the household?
- How many "adults" (15-59 years old) live in the household?
- How many old people (60+) live in the household?
- What is the highest level of education in this household?

Farm

	Production (<i>how to standardize?</i>)	Land tenure system (what are the different categories=	Distance from village	Has it been flooded in the past 3 years?
Oil palm				
Banana				
Coconut				
Rubber				
Pepper				
Rice				
Maize				
Yam				
Manioc				
Vegetables				
Fruits				
Other				

- What is the total size (ha) of your farmed land ? _____
- How much fertilizer did you apply last year? _____

Of the total food that you consume in your household, how much do you produce yourself? (in percentage)

Of the total food that you consume in your household, how much do you produce yourself? (in percentage)	
0-20	
21-40	
41-60	
61-80	
81-100	

Off farm and non-farm activities

	Income
NTFP (medicine + vegetables + fruits + rattan +)	
Salaried job	
Remittances	
Fishing	
Trade	
Wage labour (short term employment) (construction,	
Being employed in a plantation	

- Among the activities mentioned above, which one is the most important source of income in the household?
- Among the activities mentioned above, which one requires most of your time?
- What is the most expensive thing you own in this household?

Appendix 3: Themes for semi-structured interviews

The following themes are aimed to be explored in the semi-structured interviews with the households. However, the same themes - or a selection of relevant themes - could also be used for the interviews with the different key informants. The questions under each theme should be seen as ideas of what could be explored under the certain theme and not as specific questions that are going to be asked. In contrary, the questions are intended to be flexible for fitting each respondent and the issues he/she brings up. Potential key informants are representatives of the village committee (JKKK), villagers engaged in specific activities that we would like to investigate, officials working with infrastructure in the area or with forest management, villagers that are part of forest groups, the medicine man (shaman) of the village, elderly that can recall how the village has changed over time, youngsters that could share their future dreams with us among others.

Household Composition

- Which livelihood activity is each household member mainly engaged in? What are their age, gender and educational level? Why do they engage in the certain activity?
- What does a normal working day look like for each person? Working hours, income/salary, protection, vocation, pension?
- How long have they been living in Kampung Entangor?

Land

- What land do they have access to? How big is it? What is the land tenure and if commonly owned, how do they manage it?
- How long have they had access to that land?
- Do they have any land that they do not use themselves? Joint ventures? SALCRA?

Forest

- Identify activities related to forest, such as medicinal plants, leaves, nuts, berries, mushrooms, firewood, seeds for making jewellery, fibres for handicrafts, hunting, honey, timber etc.
- Identify ecosystem services which the villagers depend upon e.g. water purification, cultural, religious and recreational uses.
- Identify forest products consumed but not collected directly, i.e. by visiting a shaman, buying meat or fish hunted or fished in the forest by someone else, buying constructed material that is collected and prepared by others.
- How are the forest products sold/traded? Where?
- How is forest defined i.e. primary, secondary, cultivated, wild?
- Who has access to the forest, when etc.?
- Are there any emotional or spiritual elements connected to the forest? Has the forest area decreased? What is the cause(s) of this?

- Pulau Galau: How does it work? Who can access this forest? For what purposes? Timber? NTFP?
- Who is on the Forest Committee? How are they chosen? Genders?
- Economy of the forest. Is it profitable?
- Some villages have surrendered their PG for economic reasons? Has that been considered?
- What are the threats to the forest?
- How has the forest use changed over time?
- Were people engaged in forest related activities to a larger extent before?
- How has the relationship changed over time?

Agriculture and cash crops

- Why did they choose to grow the certain crops?
- Who introduced the crops (ie. government official, landowner, etc.)? If so, did these crops meet the expectations/perceptions which the introducing party's described?
- How long have they cultivated them for? What did they grow at the land before they switched to the certain crop?
- Do they get any subsidies?
- What kind of agricultural practices do they use for the certain crops? What do they think about them? Crop rotation (fallow), monoculture, herbicides, pesticides and fertilizers. How were they introduced?
- Are they facing any stresses related to the cash crops? Other challenges?
- Which agricultural products do they sell/trade?
- How has the agricultural practices and relationship to agriculture changed over time?
- How has agriculture changed over time?
- Any employees?
- Do they have any livestock?

Plantation next to the village

- Who is managing the oil palm plantation next to the village?
- Do people have any relation to it? Do they perceive that it impacts them in any way?
- What relation do they have to the managers and workers of the cultivation?
- Do they know anyone working there?
- If they experience any negative impacts, is there any way they could complain?
- Does anyone have employment related to the plantation? If so, what does a normal working day look like and what are the conditions (working hours, income/salary, protection, vocation, parental vocation, pension, complain mechanisms etc.) What kind of contract do they have? Do they get any benefits? What do they think about their employer?

Subsistence crops/food security

- What do people normally eat?
- How much do they buy, cultivate and select from the forest?

- Which forest and agricultural products do they use for their subsistence?
- Are there shortages of food at any period of the year?
- Is there something they would like to be able to consume to a larger extent?
- If they have diversified their livelihoods in some way recently, does that impact their food habits?
- Where do they sell/trade the agricultural products? To whom and where? Where does the next person sell them? Identify the chain.

Infrastructure

- Has the road had any impact on people's access to markets, education and medical care? If so, how?
- Has the road impacted their livelihood portfolio?
- How has the road changed the use/sale of forest products?
- How has the road changed the use/sale of agricultural products?
- Do they have electricity or access to electricity? Internet?
- What are they using for transportation?
- Do they have access to tractor etc.?

Water

- Where do they get the water from? (for the cultivation, livestock, drinking and cleaning)?
- Do they have access to enough water?
- How do they perceive the water quality? Has it changed over time?

Institutions

- What is their relation to the municipality or other bodies of governance?
- Do they feel that they are being listened to? Is their voices heard?

General Reflection Questions

- What do they think about the activities that they engage in (if something seems to become more dominant)?
- Is there any activity that they would like to engage in to a larger extent? Why?
- What are the main challenges? Are there any challenges related to the cash crops/forest activities?
- What would be their main aspiration for the future?
- Do they regret any of their choices regarding the different activities?
- Has prices been impacted by the road, the introduction of different cash crops, the establishment of the plantation or similar?
- Is there a conflict interest between the forest activities and the cash crop activities?
- Has a larger engagement in cash crop activities impacted the engagement in forest related activities? (both time perspective as in less time to engage in the activities and physical damage/ environmental impact of the cultivations)

- How do they feel about plantations? Are they more lucrative/ easier than harvesting from the forest?
- Would they choose different livelihood strategies if they could start over?
- Has the quality of life changed in any ways during the recent years? If so, why and in which ways?
- How do they perceive their quality of life if they compare with their parents or how it was when they were a child in comparison with how it is for their children today?

Identifying Livelihood Activities for PRA-Ranking

- Go through the different activities in which they are engaged and make sure to understand what the main importance of them is (focus mainly on forest and agricultural products).